LEONG SOON CHEE

CUSTOMER LOYALTY AND THE EFFECTS OF COMMITMENT TOWARDS SUPPLIERS IN MALAYSIAN ELECTRICAL AND ELECTRONICS MANUFACTURING INDUSTRY

DBA 2019

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DOCTOR OF BUSINESS ADMINISTRATION
UNIVERSITI UTARA MALAYSIA
May 2019

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By

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Thesis Submitted to
Othman Yeop Abdullah Graduate School of Business,
Universiti Utara Malaysia,
in Partial Fulfillment of the Requirement for the Doctor of Business Administration

OTHMAN YEOP ABDULLAH GRADUATE SCHOOL OF BUSINESS
UNIVERSITI UTARA MALAYSIA

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Program Pengajian (Programme of Study)	:	Doctor of Business Administration
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ABSTRACT

This study investigates the influences of product quality, and prominent relational elements, namely trust, cooperation, and communication, on customer loyalty, and mediating effects of commitment in Malaysian electrical and electronics manufacturing industry. The study utilizes quantitative methodology, where survey questionnaires are sent to Malaysian electrical and electronics manufacturing firms, which are randomly selected from two directories. A total of 267 returned and useable survey questionnaires are accepted for data analysis, which consists of data screening, response rate, descriptive statistics, PLS-SEM, and mediation effects. PLS-SEM analysis findings determine that product quality and cooperation have significant influences on customer loyalty. In contrast, trust and communication do not have significant influences on customer loyalty. Mediation effect analysis findings establish that commitment significantly mediates the four relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty. Two relationships between product quality and customer loyalty, and cooperation and customer loyalty are partially mediated by commitment. The other two relationships between trust and customer loyalty, and communication and customer loyalty are fully mediated by commitment. This study has managerial implications for the Malaysian electrical and electronics manufacturing industry, where customer loyalty can be developed with influences of product quality and relational elements, in which not all of them develop customer loyalty in similar ways; only cooperation has direct influence on customer loyalty. Nevertheless, with the presence of mediating effects of commitment, all three relational elements (trust, communication, and cooperation) can develop customer loyalty indirectly.

Keywords: Customer loyalty, product quality, relational elements, commitment, manufacturing

ABSTRAK

Kajian ini menyiasat pengaruh kualiti barangan dan elemen relasional utama, iaitu kepercayaan, kerjasama dan komunikasi terhadap kesetiaan pelanggan, dan kesan perantaraan komitmen dalam industri perkilangan elektrik dan elektronik di Malaysia. Kajian ini menggunakan kaedah penyelidikan kuantitatif dengan cara soal selidik tinjauan dihantar ke kilang-kilang pembuatan elektrik dan elektronik Malaysia yang dipilih secara rawak daripada dua buah buku panduan. Sejumlah 267 soal selidik tinjauan yang dikembalikan dan boleh digunakan telah diterima untuk analisis data yang terdiri daripada saringan data, kadar maklum balas, statistik deskriptif, PLS-SEM, dan kesan pengantaraan. Hasil analisis PLS-SEM menentukan bahawa kualiti barangan dan kerjasama mempunyai pengaruh yang signifikan ke atas kesetiaan pelanggan. Sebaliknya, kepercayaan dan komunikasi didapati tidak mempunyai kesan yang signifikan ke atas kesetiaan pelanggan. Hasil analisis kesan pengantaraan mendapati komitmen secara signifikannya mengantarakan empat hubungan iaitu hubungan di antara kualiti barangan dan kesetiaan pelanggan, kepercayaan dan kesetiaan pelanggan, kerjasama dan kesetiaan pelanggan, dan komunikasi dan kesetiaan pelanggan. Dua hubungan, iaitu hubungan di antara kualiti barangan dan kesetiaan pelanggan, dan hubungan di antara kerjasama dan kesetiaan pelanggan sebahagiannya diantarakan oleh komitmen. Dua hubungan yang lain, iaitu hubungan di antara kepercayaan dan kesetiaan pelanggan, dan hubungan di antara komunikasi dan kesetiaan pelanggan, diantarakan sepenuhnya oleh komitmen. Kajian ini mempunyai implikasi pengurusan terhadap industri perkilangan elektrik dan elektronik di Malaysia kerana melaluinya kesetiaan pelanggan boleh dibentuk dengan pengaruh kualiti barangan dan elemen relasional, akan tetapi tidak semua elemen hubungan membentuk kesetiaan pelanggan dengan cara yang sama; hanya kerjasama yang mempunyai pengaruh secara langsung ke atas kesetiaan pelanggan. Namun begitu, dengan kehadiran kesan pengantaraan komitmen, ketiga-tiga elemen relasional (kepercayaan, komunikasi, dan kerjasama) boleh membentuk kesetiaan pelanggan secara tidak langsung.

Kata kunci: kesetiaan pelanggan, kualiti barangan, elemen relasional, komitmen, perkilangan

ACKNOWLEDGEMENTS

Many hours of efforts have been devoted to complete this dissertation. This dissertation would not be possible without the contributions of many individuals, business organizations, colleagues, lecturers, and Universiti Utara Malaysia. I would like to express sincere thank you to all of them.

The following individual and groups deserve special mentions here.

1) Dr. Maria Abdul Rahman - I would like to express my gratitude to her, who has been patiently guiding and supervising me on this Doctor of Business Administration dissertation. She has provided necessary academic guidance and supports that I need for this study. Without her timely helps at several junctions, this DBA study could be a frustrating and overwhelming pursuit. I have great respect and gratitude to her.

2) I treasured all the patience, love, encouragements and supports from my family members. I would like to express appreciations for all the adjustments that they have done for me, and the sacrifices that they have been through during this period. I firmly believe my relentless pursue for knowledge and excellence will set a good example for the family.

3) At last but not least, special appreciations to my close friends, colleagues, and business associates, who shared their thoughts on industry issues pertinent to the Malaysian manufacturing electrical and electronics industry. Their thoughts have indeed shaped the course of study in this Doctor Business Administration dissertation.

Leong Soon Chee
(24th. February, 2018)

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LIST OF ABBREVIATIONS

AMOS	Analysis of a Moment Structures
AVE	Average variance extracted
ASL	Approved Suppliers List
B2B	Business-to-business
B2C	Business-to-consumer
CAD	Computer Aided Design
CB-SEM	Covariance-based SEM
E&E	Electrical and electronics
FMCG	Fast moving consumer goods
IT	Information technologies
MIDA	Malaysian Investment Development Authority
MNC	Multinational Corporations
NPD	New product development
PCB	Printed circuit board
PLS-SEM	Partial Least Squares – Structural Equation Modeling
PCA	Principal Component Analysis
R&D	Research and development
SEM	Structural Equation Modeling
SPSS	Statistical Package for Social Science
VAF	Variance Accounted For
VIF	Variance Inflation Factor

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Customer loyalty is crucially important for suppliers to enhance their capabilities, to be more competitive in the industries, and to achieve better financial results. But gaining customer loyalty in the competitive electrical and electronics (E&E) industry can be a challenging task, often involving various predictors and different approaches. This study is initiated to investigate how customer loyalty can be developed in Malaysian E&E manufacturing industry. It examines the influences of product quality, and prominent relational elements, namely trust, cooperation, and communication, on customer loyalty, and the mediating effects of commitment on the relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty. The study starts with this chapter, which consists of the following activities; background of study, problem statement, research questions, research objectives, significance of study, scope of study, definition of keys terms, and organization of dissertation.

1.1 Background of Study

Malaysia is considered one of the global manufacturing hubs for E&E products (AHK, 2012). The E&E industry leads the Malaysian manufacturing sector with significant

contributions to economy, employment and development of supply chain related industries. MIDA (2017a) reported that the E&E industry contributed 44.6 percent of the total Malaysian manufacturing output, 36.6 percent of the Malaysian exports, and 25.3 percent of employment in 2016. Malaysian E&E products are exported to major industrialized countries in North America, Europe, China, Singapore and Taiwan, and supplied to the domestic E&E markets, with a total combined value of RM 287.7 billion (MIDA, 2017b). The E&E industries is considered the major driver for industrial development in Malaysia, because it benefits and propels the growth of related industries. Notwithstanding the important contributions of Malaysian E&E industry, however, it is experiencing declining export growth rate in recent decades. Malaysian E&E export rates have decreased gradually since the peak periods in the 1970s and 1980s (Bank Negara Malaysia, 2015).

The Malaysia E&E industry is organized around two sectors (MIDA, 2014). The first sector is categorized as Electrical, which manufactures electrical parts and appliances. The second sector is categorized as Electronics, which can be further grouped into three sub-sectors. The first sub-sector is Electronics-Components, which is the biggest sub-sector with regards to export revenue, and employment. This sub-sector hosts manufacturing activities for electronics components. The second sub-sector is the Electronics-Consumers, which has manufacturing activities for consumer products. The third sub-sector is the Electronics-Industrial, which hosts manufacturing activities for industrial application products. In summary, the Malaysian E&E industry can be classified into four sub-sectors, namely Electrical, Electronics-Components, Electronics-Consumers, and Electronics-Industrial.

Malaysian E&E manufacturing industry is predominantly operated in business-to-business (B2B) markets (MIDA, 2017b). E&E products are not sold directly to consumers, rather to buying business organizations. The business transactions are between organizations to organizations. The nature of B2B purchases involves high quantity volume and more frequent for E&E products with sophisticated specifications. The process to supply E&E products involves complex steps, where suppliers are initially assessed, and qualified by E&E manufacturing firms. An Approved Suppliers List (ASL), which lists all the qualified suppliers, is maintained by most E&E manufacturing firms, and purchases are done through the qualified suppliers listed in the ASL (Forrester, 2014). It is important practices in the E&E manufacturing industry for suppliers to strive hard to accomplish qualification and to be listed in the ASL, and take all necessary actions to foster customer loyalty. This study is conducted in the B2B setting of Malaysian E&E manufacturing industry.

E&E industry are subjected to many challenges from global competitions, rapid technological innovations, and cyclical demands (AHK, 2012; International Labor Organization, 2014; Thorbecke, 2015). Although some of these challenges create numerous benefits for E&E manufacturing firms, such as providing many choices, greater values for money, and better services, they have major implications on the suppliers, particularly to their efficiencies, profitability, and as well as business sustainability.

Business globalization creates serious challenges in the Malaysian E&E industry (AHK, 2012; Muhammad & Yaacob, 2009). Although business globalization brings benefits to

Malaysian E&E manufacturing industry, it also creates global competition on price discounting. Malaysian suppliers have to compete fiercely against the onslaught of cheap products from foreign countries. Rapid advancements and changes in technology is a major concern to suppliers in the E&E industry. Although technology advancements can enable suppliers to differentiate their products against competitions, they require costly investments, are disruptive to current technologies and obsolescing existing products. International Labor Organization (2014) highlighted that E&E business is cyclical and subjected to economic recessions. Suppliers in the Malaysian E&E industry, especially those at the tail end of supply chain, are affected the most by the economic cycles.

Against these challenges in the E&E industry, it has become pressing matters for suppliers to seek new approach to gain competitive advantage. In general, they have three approaches to gain competitive advantage. The first approach involves adopting cost leadership through price discounting. Although this approach gains advantage in the short term, it can hurt profitability and affect business sustainability in the medium and long term (Heck, Kaza & Pinner, 2011). The second and third approaches engage them to excel in product differentiation, and relationship marketing. It is reported that successes in both the approaches can create customer loyalty, which is the cornerstone of competitive advantage (Dagger, David & Ng, 2011; Gebauer, Gustafsson & Witell, 2011; Magretta, 1998; McDonnell, Beatson & Huang, 2011).

Customer loyalty is important to suppliers, because it enables the suppliers in E&E industry to benefit from repeated and frequent purchases from loyal customers (Bowen & Shoemaker, 2003; Vuuren, Roberts-Lombard, & Tonder, 2012), reduce inventory level

and inventory cost (Akman & Yuror, 2012; Singh, 2013), minimize operation costs (Giovanis & Tsoukatos, 2013), positive word of mouth and advocacy from loyal customers (Abdolvand & Norouzi, 2012; Fullerton, 2011), take advantage of price insensitiveness despite alternatives are available to the loyal customers (Zeithaml, Berry & Parasuraman, 1996), and collaboration with loyal customers on new product and technological developments (Chan & Chong, 2012; Khor & Udin, 2012). Essentially, customer loyalty leads to profitability and business sustainability for the suppliers. Furthermore, Hetesi (2012), and Servais and Jensen (2012) reported that customer loyalty can exist even in time of economic recessions, which are not uncommon in the E&E industry.

Loyal customers also gain competitive advantage from the mutual beneficial relationships with suppliers, as their (customers) businesses can operate with more efficiency, and increase competitiveness in the markets. Akman and Yuror (2012) pointed out that the cooperative relationship with suppliers can eventuate to lower operating costs, sustainable vital supplies, sharing of business risks, efficient management of inventory, streamlined processes and operations, shorter cycle time for product development and delivery, consistent product quality, and increase profitability.

It is possible that both the effects of product differentiation and relationship marketing are complementary to develop customer loyalty. Conceptually, Cater and Cater (2010) illustrated that the effects of product quality, which is an essential form of product differentiation, and relationship marketing can co-exist in the attempt to develop

customer loyalty in the manufacturing industry. Product quality can affect on customer loyalty directly. It can also indirectly effect on customer loyalty via commitment, which is an important mediator in relationship marketing. In the same attempt, relationship marketing through relational elements, such as trust, cooperation and communication, can affect on customer loyalty indirectly via commitment, in addition to their direct effects on customer loyalty. Hence, it is viable that both the effects of product quality and relational elements of relationship marketing can be complementary, and suppliers can use them simultaneously to develop customer loyalty in the manufacturing industry. This study adopts similar concept to examine the effects of product quality and relational elements of relationship marketing, namely trust, cooperation and communication, on customer loyalty, and the mediating effects of commitment in Malaysian E&E manufacturing industry.

It is widely held that commitment plays central role in relationship marketing (Dubey et al., 2018; Milosevic, Trajkovic, Rajic, & Dorđevic, 2018; Morgan & Hunt, 1994). Commitment is regarded as an influential mediator in enabling relationship benefits. Within the context of Malaysian E&E manufacturing industry, value proposition is important in business relationships, as Malaysian E&E manufacturing firms are willing to work and make commitment to suppliers who can offer values associate with product quality, trust, cooperation, and communication that are critical to their operations. For instance, supplier with high degree of trust provides value by protecting intellectual properties, which is critically important for Malaysian E&E manufacturing firm, to prevent imitations by competitors. Malaysian E&E manufacturing firm commitment is

essential to supplier because of its important effect on customer loyalty (Kim, Kim & Lee, 2018; Warren, Lubbe, & Roberts-Lombard, 2018; Dikcius, Kirse, Casas & Koncanina, 2019). Due its linkages to both predictors, such as product quality, trust, cooperation, and communication, and customer loyalty, commitment plays important role in mediating the relationships between the predictors, and customer loyalty. Moreover, Morgan and Hunt (1994) identified commitment as one of the key mediating variable in business relationships. Thus, this study contends and adopts the perspective that commitment mediates relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty in Malaysian E&E manufacturing industry.

1.2 Problem Statement

The Malaysian E&E exports grew most rapidly between the period of 1970s, and early 2000s, where E&E accounted for more than 60 percent of total exports of Malaysia in this period. However, E&E exports have been gradually declining since then. Figure 1.1 shows the trend depicting the export contributions of E&E products to the total Malaysian export, which is compiled from statistics published by Bank Negara Malaysia, between period of 2000 and 2016. Accordingly, E&E exports had decreased as much as 43 percent from 70 percent in 2002 to 37 percent in 2016. In the Malaysia E&E industry, exports are characterized by repeated made-to-order, where suppliers manufacture and export their products according to purchase orders. The decreasing exports indicated that suppliers were struggling with reducing repeated purchase orders, and attracting new ones. Suppliers' efforts in managing customer loyalty, which has expected effects on

repeated orders, and attracting new sales, are apparently less effective, and warrant serious actions for improvements.

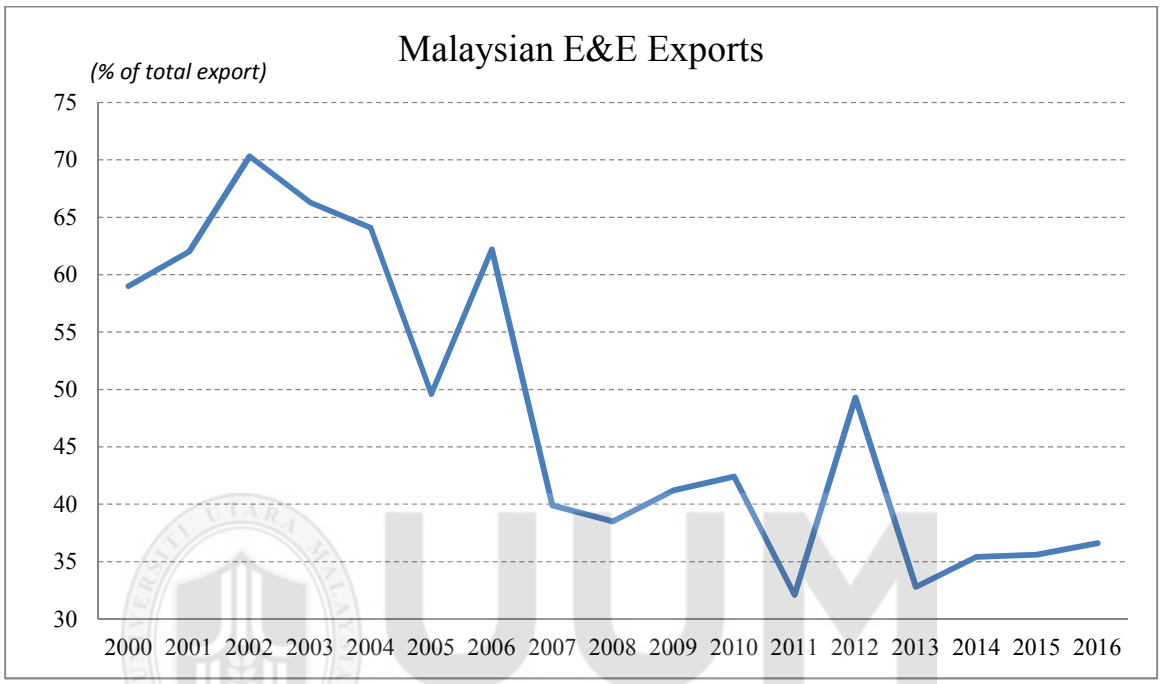

Figure 1.1

Malaysian E&E exports

Bank Negara Malaysia (2015) alerted that the growth of Malaysian E&E industry has been underperforming with reference to its regional peers, namely Singapore, South Korea, China, and Taiwan. Figure 1.2 shows the growth rate between of 2011 to 2015 comparing the growth of Malaysian E&E industries against its regional peers of China, Chinese Taipei (Taiwan), and South Korea. Except for a brief period of two quarters in 2011, it is obvious that the growth of Malaysian E&E industry has been consistently lagging behind other E&E industries. Bank Negara Malaysia (2015) further cautioned that Malaysian E&E industry has difficulties to maintain growth trajectory amidst fierce

competitions from its regional peers. It is apparent that suppliers in the Malaysian E&E industry were losing competitive advantage against their rivals in China, Taiwan, and South Korea. Suppliers should actively pursue customer loyalty, which is the cornerstone of competitive advantage, to influence on repeated orders, frequent purchases, and recommendations that drive business growth (Reichheld, 2003).

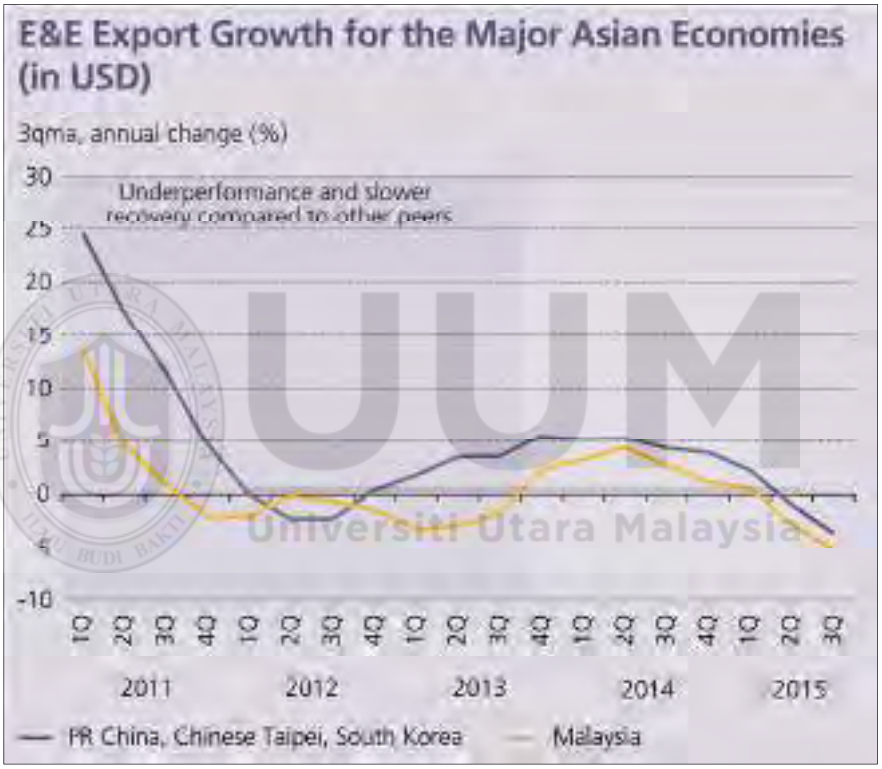

Figure 1.2
E&E export growth for the major Asian economies
Source: Bank Negara Malaysia (2015)

ETP (2012) reported that the Malaysian E&E industry is traditionally populated with low-value added activities, such as assemblies and testing. As the global competition increased in recent years, foreign-owned E&E firms in Malaysia consolidated, ceased

operations, or moved the low-value added manufacturing activities to countries with lower operation costs. For instance, at least 13 major E&E multinational corporations (MNC) had announced to cease operations in Malaysia from 2015 to 2016 (LinkedIn, 2016a). The closures had adversely affected many domestic suppliers in the supply chains, and as well as thousands of jobs. Malaysian suppliers have attempted to shift up the value chain by focusing on high-value added manufacturing activities to counter this adverse effect. However, they encounter serious challenges as these activities have already been dominated by the Japanese, Taiwanese, South Korean, and Singaporean manufacturing firms (ETP, 2012). Malaysian suppliers are apparently struggling to break the competition barrier and gain foothold in the high-value added manufacturing activities that require differentiated products, specifically with superior quality, and close relationships with loyal customers.

In recent years, various industrial sources have reported that there is a significant trend towards holding few suppliers in the manufacturing industries (Tang, Zimmerman & Nelson, 2009; Ulaga & Eggert, 2006a; Zsidisin, Ogden & Ellram, 2003). This trend has further compounded the existing problems faced by suppliers in Malaysian E&E manufacturing industry. For example, Sony Corporation, which has three manufacturing plants and one procurement center in Malaysia, has announced to reduce number of suppliers to 1,000 in 2013, from 2300 in 2000 (Reuters, 2014). Customer Sony was seeking ways to improve efficiency, reduce operation costs, sharing business risks, and create values by working with few valuable suppliers. The industrial shift has created profound impact on customers and suppliers alike. From customer perspective, customers

are looking for differentiation among suppliers, and selecting only those worthy suppliers for inclusion into the customer ASL. On the supplier standpoint, suppliers must compete and differentiate themselves by delivering values beyond merely selling products. Given the growing trend towards reduced supplier base, the challenge of getting into the customer ASL, and to defend the position there amidst competition have becomes an issue of utmost concern to suppliers in Malaysian E&E manufacturing industry. Developing commitment from Malaysian E&E manufacturing firms for inclusion into ASL, and maintaining customer loyalty for preservation of position in ASL have become more complex than ever.

Asian countries, such as China and Malaysia, are popular regions for low-cost material sourcing activities in the E&E industry (LinkedIn, 2016b). In the low-cost manufacturing sourcing process, E&E manufacturing firms can act as a procurement center, perform simple manufacturing activities, such as re-packaging, labeling, or testing, and distribute the products to end customers, especially affiliates of the E&E manufacturing firms in overseas. Traditionally, suppliers in the Malaysian E&E industry benefit from the E&E manufacturing firm loyalty due to end customers' preferences for their products and cheaper pricings. Due to the continued weakening of brand preference, commoditization of products, and erosion of price advantages, as a result of intense and prolong competitions in the E&E industries, suppliers are under pressure to gain commitment and build intense customer loyalty with E&E manufacturing firms in order to secure their allocation of resources, and willingness to recommend products to other customers instead of products from overseas sources (Christopher & Holweg, 2011; Wan, Al-

Mamun, Permarupani & Zainol, 2013). Better understanding of commitment and customer loyalty with the E&E manufacturing firms has become paramount important in the attempt to arrest the declining Malaysian E&E exports.

In the B2B industries, product quality, and relational elements, namely trust, cooperation, and communication, are important with reference to customer loyalty (Cater & Cater, 2010; Human & Naude, 2014; Rai & Srivastava, 2012). Relationship marketing and supply chain literatures have adequately studied the direct influences of product quality and the relational elements on customer loyalty, however, as pointed out by several researchers (e.g. Cater & Cater, 2010; Wu, Chen & Chen, 2015), that there is less attention in examining the indirect influences of the four predictors (product quality, trust, cooperation, and communication) toward customer loyalty via the mediating effect of commitment in the B2B industries. The indirect influences on customer loyalty are feasible in the E&E manufacturing industry considering customers have difficulties to source alternative products with superior quality elsewhere. In order to continue receiving the products with superior quality, customers make commitment to secure the supply of the products for their manufacturing operations, and to stay loyal with the suppliers. Relational elements of trust, cooperation, and communication can provide intangible values, such as assurance against opportunism in specific asset investments (Wu et al., 2015), and for protection of customers' product intellectual properties (Jean, Sinkovics & Hiebaum, 2014). In similar way, customers make commitment and stay loyal with the suppliers, in order to continue taking advantage of the intangible benefits. Thus, it is possible for suppliers to gain customer loyalty with the indirect approach in the E&E

manufacturing industry. Nonetheless, there are few attentions in the extant literatures reporting on the crucial indirect effects of the four predictors toward customer loyalty via commitment that can guide suppliers in Malaysian E&E manufacturing industry, who are seeking ways to increase competitive advantage.

In summary, the aforementioned reviews have identified critical business problems in the Malaysian E&E industry. Notwithstanding the important of Malaysian E&E industry to the nation economy, and employments, E&E exports has been gradually declining since its peak periods in the 1970s, and early 2000s. Suppliers in the Malaysian E&E industry should concern about customer loyalty because of its expected effects on repeated orders, attracting new ones, and recommendations that are helpful to revert the declining growth rate, and to increase exports. Malaysian E&E industry has attempted to move up the value chain, but it faces difficulties to break the barrier of competition and gaining foothold in the high-value added manufacturing activities, as these activities are already dominated by the Japanese, Taiwanese, South Korean, and Singaporean E&E manufacturing industries. The global trend towards reducing supplier base in the manufacturing industries has also affected Malaysian E&E manufacturing industry, as suppliers are grappling for inclusion and defending their positions in the customer ASL. Developing commitment from Malaysian E&E manufacturing firms for inclusion into ASL, and maintaining customer loyalty for preservation of position in ASL have become more complex than ever. Better understanding of commitment and customer loyalty with immediate E&E manufacturing firms is utmost important in manufacturing sourcing to secure allocation of resources, and willingness to recommend products to overseas

customers.

Product quality and relationship marketing approaches can be adopted to complementary influence customer loyalty. Relationship marketing and supply chain studies have adequately researched the direct effects of product quality, trust, cooperation, communication towards customer loyalty, however, there are few studies reporting on the respective indirect effects on customer loyalty. It is possible for the four predictors, namely product quality, trust, communication, and cooperation, to indirectly effect on customer loyalty via commitment in the E&E manufacturing industry. Therefore, this study is conducted to examine the direct effects of product quality, trust, cooperation, and communication toward customer loyalty, and as well as the indirect effects of the four predictors toward customer loyalty via commitment in Malaysian E&E manufacturing industry.

1.3 Research Questions

Based on the problem statements that have been described, the following research questions are developed that best serve the purposes of this study. The research questions are related the influences product quality, trust, cooperation, and communication toward customer loyalty, and the mediating effects of commitment on the respective relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty. Essentially, the research problems are stated as follow:

a) Do product quality, trust, cooperation, and communication influence customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry?

b) Does commitment mediate the relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry?

1.4 Research Objectives

Two research objectives are set with reference to the two corresponding research questions of this study. They are stated as follow:

a) To examine the influences of product quality, trust, cooperation, and communication on customer loyalty of Malasyian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

b) To investigate the mediating effects of commitment on the relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

1.5 Significance of the Study

This study provides greater insight into the development of customer loyalty in Malaysian E&E manufacturing industry. In general, it demonstrates two complementary approaches to affect customer loyalty. The first approach involves product quality, which is an essential form of product value differentiation, to influence customer loyalty directly and indirectly with the presence of mediation effect of commitment. The second approach involves relationship marketing, where relational elements of trust, cooperation, and communication indirectly influence customer loyalty via mediation effect of commitment, and as well as their direct influences on customer loyalty. These two complementary approaches of affecting customer loyalty are expected to create essential knowledge that assists researchers and practitioners in creating comprehensive understanding on development of customer loyalty in Malaysian E&E manufacturing industry. The implications of this study can be grouped into two categories, which are theoretical contributions, and managerial contributions.

1.5.1 Theoretical Contributions

This study is expected to make essential contributions to the extent of existing body of knowledge in the area of customer loyalty. The extant relationship marketing and supply chain literatures have adequately studied the direct relationships between predictors, specifically product quality, trust, cooperation and communication, and customer loyalty, however, as pointed out by several researchers (e.g. Cater & Cater, 2010; Tsai, 2011; Wu et al., 2015) that they are still lacking attention on the respective indirect influences of these predictors toward customer loyalty even though they are feasible in the

manufacturing industry. Thus, this study offers theoretical insight into the indirect effects of predictors, namely, product quality, trust, cooperation, and communication toward customer loyalty by incorporating the mediating role of commitment.

Many relationship marketing and supply chain literatures reported the development of customer loyalty in B2B markets in recent decades. Most of these studies are conducted in non-E&E manufacturing industries, and in foreign countries settings. As pointed out by Arikrisnan (2015), and Pooladireishahri, Asgari, Hamid, and Asgarpour (2015), however, there is scarcity of research literatures reporting the development of customer loyalty in Malaysia, particularly in the E&E manufacturing industry. This study is conducted to investigate the influences of predictors, namely product quality, trust, cooperation and communication on customer loyalty and the mediating effects of commitment on the respective relationships in Malaysian E&E manufacturing industry setting. Therefore, this study is expected to bridge the current deficiency in the extant relationship marketing and supply chain literatures. The empirical findings of this study can serve as valuable source of reference to guide future academic studies for the development of customer loyalty in Malaysian E&E manufacturing industries.

1.5.2 Managerial Contributions

Although the E&E industry remains the largest manufacturing industry in Malaysia, it is facing difficult challenges to arrest the declining exports, and to catch-up trajectory growth with its regional peers (Bank Negara Malaysia, 2015). Practitioners in the E&E manufacturing industry are hard-pressed to seek ways to gain competitive advantage.

Product quality and relationship marketing can be used to influence customer loyalty, which is the cornerstone of competitive advantage. This study can be beneficial to practitioners by shedding lights on the effects of four predictors, namely product quality, trust, cooperation, and communication toward customer loyalty. Essentially, it offers important information with practical implications on the direct effects of the four predictors toward customer loyalty, and the indirect influences of the four predictors on customer loyalty via commitment.

Several prominent sources have alerted that marketing thoughts are gradually shifting away from product offerings to relationship marketing (Cater & Cater, 2010; Eggert, Ulaga, Frow & Payne, 2018; Gil-Saura, Frasquet-Deltoro, & Cervera-Taulet; 2009). They argued that, due global competition, advancing technologies, and imitations, B2B suppliers are no longer relying of product offerings alone. The B2B suppliers are gradually incorporating relationship marketing, complementing their product offerings, to develop long term relationship with loyal customers. As such, the empirical findings of this study can shed insights on the influences of product quality, which is an essential form of product value offering, towards customer loyalty, and the influences of trust, cooperation, and communication on customer loyalty. Thus, the empirical findings of this study are essential to practitioners in Malaysian E&E manufacturing industry to gain better comprehension of the prevailing trend involving product offering, and relationship marketing.

Malaysian E&E manufacturing industry is subjected several industrial problems that

emerged in recent years. There is a growing industrial trend of reduced supplier base in manufacturing industry. Suppliers are grappling to develop commitment with Malaysian E&E manufacturing firms, and build intense customer loyalty in order to secure their positions in the customer ASL. In the value-added E&E manufacturing industries, suppliers have attempted to move up the supply chain by adopting high value-added manufacturing activities, however, these activities have already been dominated by foreign E&E manufacturing industry. The high value-added manufacturing activities require products with superior quality, and building loyal relationships around them with Malaysian E&E manufacturing firms. In the manufacturing sourcing industry, better understandings of commitment and customer loyalty from immediate E&E manufacturing firms is necessary to revert the declining trend of E&E product orders.

All these business problems have further compounded by the declining E&E product exports, and facing difficulties to catch up trajectory growth amidst global competition from region peers. It is necessary for suppliers to seek new approach to gain commitment from Malaysian E&E manufacturing firms, and to develop customer loyalty more effective. The empirical findings of this study offers valuable practical information to suppliers in Malaysian E&E manufacturing industry on the development of commitment from Malaysian E&E manufacturing firms, and to develop intense customer loyalty through the influences of product quality, and relational elements of trust, cooperation, communication, and the mediating effects of commitment.

1.6 Scope of Study

Scope of this study is confined to Malaysian E&E manufacturing industry, which is selected for this study because of the following important reasons; a) Malaysian E&E industry is encountering declining export growth trend (Bank Negara Malaysia 2015). There is an urgent need to regain competitive advantage by focusing on developing commitment and long term beneficial relationships with loyal customers, b) Malaysian E&E industry is the largest manufacturing sector in Malaysia, where the industry is expanding into R&D, and related supply chain activities (MIDA, 2014; PEMANDU, 2014). Many B2B relationships are expected to be created in the expanding supply chains, and thus, it is crucially important to develop greater understanding on the development of customer loyalty within the expanding supply chains in Malaysian E&E manufacturing industry. This study focuses on E&E manufacturing firms that are operating in the country of Malaysia.

The sample frame of this study involves Malaysian E&E manufacturing firms that are listed in two directories, namely, Federation of Malaysian Manufacturers Industry Directory (FMM, 2016), and Malaysia External Trade Development Corporation (MATRADE) directory for computer hardware, consumer and industrial E&E products, telecommunication, and E&E parts and components (MATRADE, 2016). The E&E manufacturing firms are representative of the four sub-sectors of Malaysian E&E industry, namely, Electronics-Components, Electronics-Consumer, Electronics-Industrial, and Electrical (MIDA, 2014). There are operating in the B2B market, where material and components are purchased from other firms. A total of 782 E&E manufacturing firms are

identified in the two directories. Systematic random sampling is adopted, where each of the E&E manufacturing firms has equal and random chance of being selected for the study (Sekaran & Bougie, 2013).

Data collection is restricted to three months period due to time and resources constraints in this study. In between the three months of data collection period, two follow up reminders are sent to respondents with the intention to increase response rate. The first follow-up reminder is sent one month after the initial sending, and the final follow-up reminder is sent one month after the first follow-up reminder.

The targeted respondents of this study are General Manager, Factory Manager, Purchasing Manager, Sourcing Manager, Supply Chain Manager, Supplier Quality Manager, Quality Manager, Material Manager or any senior staffs, who have decision making roles in managing suppliers. Only one respondent from each of Malaysian E&E manufacturing firms is permitted for the questionnaire survey, since the unit of analysis is identified as organization for this study.

1.7 Definitions of Key Terms

The descriptions and definition of the following keys are listed below. They are cited throughout in this dissertation.

a) Customer loyalty is defined by Pearson (as cited in Rai, 2012) as "the mind-set of a customer, who hold a favorable attitude toward a company, commits to

repurchase the company's products (or services), and recommends the products (or services) to others." This definition takes into account aspects of behavioral loyalty and attitude loyalty. Customer loyalty is operationally defined by preference, positive words of mouth, recommendation, and repurchase in this study (Askariazad & Babakhani, 2015).

b) Product quality is defined as "conformance to specification" (Crosby, 1979). This definition is based on the manufacturing-based approach to defining product quality (Garvin, 1984). The manufacturing-based approach takes into account the consistency in conformance, reliability, and performance. Product quality is operationally defined by consistency in conformance, reliability, and performance (Ulaga & Eggert, 2006a).

c) Trust is defined as "a willingness to rely on an exchange partner in whom one has confidence" (Moorman, Zaltman & Deshpande 1992). In this study, this definition is viewed from the belief and inter-organizational perspectives (El-Manstrly, 2016; Moorman et al., 1992). Trust is operationally defined by reliability, credibility, benevolent, competency, and integrity in this study (Chen, Yen, Rajkumar, and Tomochko, 2011).

d) Cooperation is defined as "similar or complementary coordinated actions taken by firms in interdependent relationship to achieve mutual or singular outcomes with expected reciprocation over time" (Anderson & Narus, 1990). This definition

takes into account the cooperation norms that involve joint efforts and flexibility in response to changing situations, and accommodating each other's needs. (Cannon & Perreault, 1999). Cooperation is operationally defined by joint efforts and flexibility in response to changing situations, and accommodating each other's needs and flexibility in response to changing in this study (Cannon & Perreault, 1999).

e) Communication is defined as "the formal as well as informal sharing of meaningful and timely information between firms" (Anderson & Narus, 1990). This defintion takes into consideration of the formal and informal exchange of information, timeliness, and keeping personnel informed (Krause & Ellram (1997). Communication is operationally defined by formal and informal exchange of information, timeliness, and keeping personnel informed in this study (Krause & Ellram, 1997).

f) Commitment is defined as "an enduring desire to maintain a valued relationship" (Moorman et al., 1992). This definition is conceptualized as a global construct in this study (Haghkhah, Abdul Hamid & Ebrahimpour, 2013; Morgan & Hunt, 1994). This study investigates the mediating effects of commitment of Malaysian E&E manufacturing firms towards their suppliers. Commitment is operationally defined by behavioral intentions to maintain and sustain the relationship in this study (Ulaga & Eggert, 2006b).

g) Preferred supplier is described by Routroy (2018) as "supplier that has been

qualified and approved by customer. When the customer needs supplies, it turns of this supplier first". There are several qualities expected from a preferred supplier. Special treatment to customer is important, as are qualities such as on cooperation, communication, trustworthy, high quality of supplies, and reasonable pricing.

h) Malaysian E&E manufacturing firms are referred as customers in the Malaysian E&E manufacturing industry in this dissertation.

1.8 Organization of Dissertation

This dissertation is organized into five chapters. Chapter One begins by providing an overview of the Malaysian E&E industry, and challenges associated with the E&E industry. It follows by problem statement identifying the research gaps in the extant relationship marketing studies on customer loyalty. There are two research questions identified with reference to the identified research gaps. Subsequently, two research objectives are established corresponding to the two research questions. Significance of this study is discussed, and has highlighted the theoretical and practical contributions. Scope of study is confined to Malaysian E&E manufacturing industry, where Malaysian E&E manufacturing firms are randomly selected from two directories, namely Federation of Malaysian Manufacturers Industry Directory (FMM, 2016), and Malaysia External Trade Development Corporation (MATRADE) directory for computer hardware, consumer and industrial E&E products, telecommunication, and E&E parts and components (MATRADE, 2016). Data collection period is three months, and targeted

respondents are General Manager, Factory Manager, Purchasing Manager, Sourcing Manager, Supply Chain Manager, Supplier Quality Manager, Quality Manager, Material Manager or any senior staffs, who have decision making roles in managing suppliers. Definitions and descriptions are provided for key terms, which are cited throughout in this dissertation. Organization of dissertation explains how this dissertation is systematically arranged into five chapters.

Chapter Two introduces the concepts of relationship marketing and product differentiation, identifies two underpinning theories, and reviews of relationship marketing literatures for customer loyalty, predictors of customer loyalty, namely product quality, trust, cooperation and communication, and mediating variable of commitment. A research framework is developed based on the concepts of relationship marketing and product differentiation, and supports of two underpinning theories. From the literature reviews, several definitions for customer loyalty, product quality, trust, cooperation, communication and commitment are discussed, and the most appropriate definitions are adopted in this study. Further reviews of research literatures are performed to find supports for development of hypotheses. A total of 13 hypotheses are developed for testing in this study.

Chapter Three elaborates on the research methodology, which includes the research design, sampling design, development of measurement instrument, pre-test, pilot study, identifying source of data, and selection of data analysis methods. Techniques for data screening for missing values, multiple inputs and illegible entries, detecting errors in

normality distributions, non-response biases, common method biases, and multicollinearity are described, and to be perform to ensure appropriate quality level of data for analysis. Data analysis includes determining the descriptive statistics, assessing the PLS-SEM measurement and structural models, and evaluating the mediation effects.

Chapter Four presents the data analysis findings of this study. It begins with over view of the survey data, and then follows up with data screening for missing values, multiple inputs and illegible entries in the returned survey questionnaires, and determination of response rate. Data is further screened for errors in normality distributions, non-response biases, common method biases, and multicollinearity to ensure appropriate level of quality for data analysis. Descriptive analysis is conducted to determine the descriptive statistics for demographic profiles of organizations, and respondents, and the variables of this study. PLS-SEM analysis is performed that includes estimation of measurement model, and assessment of structural model. PLS-SEM analysis findings test nine hypotheses that are developed in this study. Mediation effect analysis is then conducted to test the remaining four hypotheses. Mediation analysis is also performed to determine the type of mediation effects on the respective relationships with customer loyalty. A summary of hypotheses testing is created to simplify the findings of this study. Chapter Four ends with a chapter summary recapitulating the findings that have been accomplished in this chapter.

Chapter Five starts with recapitulation of study with reference to the research objectives and research questions. It continues with discussions on the findings of this study.

Research implications are deliberated with regards to theoretical contributions and managerial contributions. Limitations of this study are discussed, and recommendations are provided for future studies. This dissertation ends with conclusion of this study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Chapter Two continues the discussion from previous chapter by reviewing concepts of relationship marketing and product differentiation, and underpinning theories. It proposes and discusses the research framework with reference to the concepts of relationship marketing and product differentiation and two underpinning theories, and examines relationships between the variables in this study. Suitable definitions for variables and relationships between them are discussed with references to supporting findings from previous research literatures. The discussions end with the chapter summary.

2.1 Relationship Marketing

Relationship marketing centers on attracting, creating, and maintaining long term relationships with customers. The economic benefits for taking the long term orientation have been cited by several B2B studies in relationship marketing (Ata & Toker, 2012; Ramaseshan, Rabbanee, and Tan, 2013; Streukens, van Hoesel & de Ruyter, 2011; Xu, Guo, Zhang & Dang, 2018). Accordingly, it is less costly and more efficient to conduct businesses by establishing and maintaining long term relationship with few loyal customers, than to actively pursue new ones. In addition, Wu et al. (2015) pointed out

that the long term relationships with loyal customer are difficult to imitate by competitors.

Berry (2008) defined relationship marketing as "attracting, maintaining, and enhancing customer relationships". The approach of relationship marketing consists of three important aspects (Palmatier, 2008). Accordingly, the first aspect recognizes that relationships are dynamic process and develops over long period of time through several stages, such as attracting, maintaining, and enhancing. The second aspect deals with the target, which is the customer. And the final aspect recognizes the benefits derived from the relationships. Therefore, relationship marketing involves attracting, developing, maintaining, and enhancing customer relationships that are mutually rewarding to the customers and suppliers. Ndubisi (2007) substantiated that these aspects are achievable by a mutual symbiosis of efforts from the customers and suppliers that fosters customer loyalty.

In the B2B markets, which include E&E industries, relationships between customers and suppliers can be described as close and long term with complexity in nature. Relationship marketing is predominantly adopted to establish customer loyalty, which is essentially benefited the suppliers to minimize global competitions, and mitigate high risks associate with the rapidly changing business environment (Raddats & Kowalkowski, 2014; Wu et al., 2012). Suppliers in the competitive B2B markets can no longer solely compete on the basis of product differentiation, rather to incorporate elements of relationship marketing in the product offerings. Cater and Cater (2010) have incorporated relational elements of

trust, cooperation, and commitment into the product offering, and demonstrated that the relational elements can be used to complement with product quality to enhance customer loyalty in the manufacturing industry. Similarly, Human and Naude (2014) incorporated relational elements of communication, trust, commitment, and satisfaction, in addition to product quality, to establish customer loyalty in the computer-aided design high technologies industries. Mubarik, Chandran, and Devadason (2016) discerned that, in the competitive industries, suppliers strive to build trust with customers by providing product quality at competitive cost and available within specified time. Consequently, suppliers who consistently fulfill customers' needs and expectations are able to establish loyalty from the customers.

In this study, similar approach is adopted by applying the effects of relational elements of relationship marketing and product quality, which is an essential form of product differentiation, to affect customer loyalty in Malaysian E&E manufacturing industry. Trust, cooperation, and communication are prominent relational elements, which can enable mutually beneficial relationships between Malaysian E&E manufacturing firms and suppliers. Considering the highly competitive business in the E&E manufacturing industry, trusting relationship is necessary for Malaysian E&E manufacturing firms and suppliers to pay attention on working together to prevent business risks, overcome competition, increase competitiveness, and minimize transactional costs. Cooperation is critically important in technologies industries, where Malaysian E&E manufacturing firms and suppliers have to rely more than their own capabilities to develop new capabilities, such as new products, manufacturing technologies, and markets.

Communication plays central roles in ensuring quality information is available, and exchange of information is done efficiently and effectively to keep abreast, and act on the changes. Thus, this study identifies and adopts relational elements of trust, cooperation, and communication as predictors to customer loyalty. It examines relationships between them and customer loyalty, and the mediating effects of commitment on each of the relationships.

Satisfaction is excluded in this study, as Oliver (1999) pointed out that satisfaction is not necessary enough to keep customers loyal in the B2B markets. Similarly, Narayandas (2005) commented that correlation between satisfaction and customer loyalty is not consistently established in the B2B markets. While trust, cooperation, and communication represent social dimensions, Cater and Cater (2010) classified knowledge transfer and adaptation as technical dimensions of relational elements of relationship marketing. Knowledge transfer refers to sharing of expertise, namely skills, know-how, operation and design capabilities, and marketing information between customer and supplier, for which both gain competitive advantage (Argote & Ingram, 2000). Adaptation is necessary in cooperative relationship, where supplier modifies its processes, procedures, testing, and products to suit customer expectations or requirements (Viio & Gronroos, 2014). In this study, however, these two variables are not considered because their effects are minor toward commitment and customer loyalty as compare to the social dimensions and product quality in the manufacturing industry context (Cater & Cater, 2010).

2.2 Product Differentiation

Chamberlin (1933) defined product differentiation as "the goods (or services) of one seller difference from those of another. Such a basis may be real or fancied, as long as it is of any importance whatever to buyers, and leads to a preference one variety of the product over another. Where such differentiation exists, even though it be slight, buyers will be paired with sellers, not by chance and at random (as under pure competition), but according to their preference." This definition implies that products are heterogeneous rather than homogenous. Successful products are differentiable from the pool of similar products because their unique attributes appeal, and provide benefits to the customers. Porter (1985) pointed out that, among product attributes, product quality is the primary basis of product differentiation. Suppliers adopting product differentiation characterized by product quality uniquely position their products in the market. The products differentiated with product quality protect the suppliers from competitive rivalry by creating customer loyalty, as well as creating barrier for new entries into the market (Tse et al., 2019).

In the E&E manufacturing industry, there are multiple suppliers providing similar products to the E&E manufacturing firms. Successful supplier competes with other competing suppliers for E&E manufacturing firms' attentions by offering products with unique attributes. According to Porter (1985), and Juran and Defoe (2010), product quality is considered the most important among product attributes. This is especially critical in the E&E manufacturing industry, where product quality with superiority and consistency is known to increase E&E manufacturing firms' operations efficiency,

improve images, reduce costs, and thus enhancing profitability. E&E manufacturing firms have strong reasons to commit to the relationship with supplier, and loyal to their supplier, so that it can continue to benefit from the values of product quality. In addition, Holcombe (2009) pointed out that product differentiation can enable suppliers to set higher price for its products. This is possible because E&E manufacturing firms distinguish the unique attribute associate with product quality, and values the benefits. Supplier is likely to gain commitment and loyalty from E&E manufacturing firms, even though there are cheaper sources available elsewhere.

Furthermore, E&E manufacturing firms enter into relationship with suppliers to source products, which are used as input to their operations. Unless the products meet specification requirements, and distinguished for consistency in meeting the specification, the E&E manufacturing firms have no interest to make commitment, and build loyal relationship with the suppliers. E&E manufacturing firms are firmly unwilling to compromise on products with inferior or inconsistent quality. Considering the important of performance, reliability, and safety on the final products, product quality is deemed as the most important criterion for qualifying potential suppliers into the ASL, and it is being even more important than pricing. Thus, this study identifies and adopts product quality as the predictor to customer loyalty. It examines the relationship between product quality and customer loyalty, and the mediating effect of commitment on this relationship.

2.3 Underpinning Theories

A numbers of theories have been used in relationship marketing studies to link various perspectives to customer loyalty. They provide an understanding of how and why long-term relationships are developed in businesses. Among these theories, social exchange theory, and social capital theories are reviewed and adopted in this study, as they are suitable to explain the relationships between product quality, trust, cooperation, communication toward customer loyalty, and the mediating effects of commitment on the relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty in Malaysian E&E manufacturing industry setting.

2.3.1 Social Exchange Theory

Social exchange theory has root in the fields of sociology and social psychology, and has wide applications in business, particularly in relationship marketing. The theory posits that relationship between partners is developed through the subjective cost-benefit analysis and comparison level of alternative (Gouldner, 1960; Homans, 1961, Thibaut & Kelley, 1959). In the relational exchange, this theory implies that individual partner is responsible for its self-interest, and dependence on others. According to Homans (1961), partner determines the overall worth of the relationship by comparing costs and benefits. If the costs outweigh benefits, the worth of the relationship is considered negative. On the contrary, if the costs are less than benefits, the worth of the relationship is deemed positive. Thibaut and Kelley (1959) argued that the worth of relationship influences the outcome, such as the partner's decision to continue the relationship or terminate the

relationship. Thus, partners are expected to endure the positive relationships, whereas negative relationships are likely terminated by the partners.

Shiau and Lao (2012) pointed out that social exchange theory deals with the relational dependence that develops over time through the interaction of exchange partners. Accordingly, as the customer interacts over time, they will experience the need to reciprocate the support and assistance provided by the supplier. Walumbwa et al. (2011) termed this effect as "norm of reciprocity". Supplier or customer is expected to assess the benefits and costs continuously, and make decisions to develop commitment and loyalty to the relationship, when the benefits exceed the costs (Byrne, Pitts, Chiaburu & Steiner, 2011; Homans, 1961; Thibaut & Kelley 1959; Walumbwa et al., 2011). Otherwise, the customer or supplier may decide to leave, if the relationship is not generating the necessary rewards and cost reduction benefits (Byrne et al., 2011; Homans, 1961; Walumbwa et al., 2011; Thibaut & Kelley 1959).

Dagger et al., (2011) explained that commitment and customer loyalty are expected to develop within the relationship when the customers and suppliers experience high reciprocal levels of rewards. Commitment creates stability in the relationship by increasing interdependence between customers and suppliers (Chang et al., 2012). Sambasivan, Loke, Mohamed, and Leong (2011) highlighted commitment is an important elements in the social exchange theory. Customers with strong value-based commitment are loyal to the supplier because they (customer) benefits from the relationships. Besides, commitment can prevent customers from switching, when the perceived termination costs are high (Shi et al., 2011).

Ting and Thurasamy (2016) pointed out that value proposition is considered one of the most important tenets of social exchange theory. Accordingly, the more value generates from the social exchanges between customers and suppliers, the more likely that the relationships will continue to grow between them. Based on the concept of value proposition, Moracha and Muruti (2015) demonstrated that the unique and cooperative relationships developed by customers through supplier development programs, where financial, technical and training supports are empowered to the suppliers, in return for product quality and innovations that are critical to the customers. Thiruchelvam et al. (2012) determined that social exchange theory fits well with the supplier qualification process in the power utility industry, where product quality is considered as one of the most important value or criteria for the customer to qualify, and engage suppliers in long term working relationship. Under the tenet of social exchange theory, customers is obligated to appraise the supplier appropriately upon meeting the criteria, which include product quality, set for a particular purchase. Supplier who is able to exceed the customer's expectations in the pre-defined criteria is more likely to gain customer commitment and customer loyalty for future transactions.

In summary, social exchange theory deals with relational dependence that develops over time through interaction of customer and supplier. The theory implies that customers and suppliers evaluate the cost and benefit continuously to decide the worth of the relationship. If the worth of the relationship is positive, the customers and suppliers are likely to continue with the mutual relationship. Otherwise, the customers or suppliers may terminate the relationship if the worth of the relationship is negative.

Social exchange theory is applicable in the context of Malaysian E&E manufacturing industry. Product quality is considered an important value proposition in the Malaysian E&E manufacturing industry. Malaysian E&E manufacturing firms consider the relationships worthy and loyal to suppliers, when they benefit from the values associate with product quality. In other business situation, Malaysian E&E manufacturing firms lock-in or negatively commit to the suppliers considering difficulties to find alternative products with high standard of quality elsewhere. The committed Malaysian E&E manufacturing firms are loyal to their suppliers so to secure supply of the products, and continue benefiting from the values associate with product quality.

Therefore, the social exchange theory is most suitable, and can be appropriately adopted to explain the relationships between product quality, mediator, and dependent variable respectively in the theoretical framework of this study. The predictor is product quality. The mediator and dependent variable are commitment, which is towards the suppliers, and customer loyalty respectively. The social exchange theory can be used to explain the relationships between product quality and customer loyalty that involve direct effects of product quality towards customer loyalty, and the indirect effect of product quality towards customer loyalty via the mediating effect of commitment in this study. Hence, social exchange theory is suitable, and appropriately adopted in this study.

2.3.2 Social Capital Theory

There have been many definitions of social capital theory in the extant psychology and social science literatures. For instances, Putnam (1995) defined social capital theory by

referring social capital as “features of social organizations, which as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefits”, Adler and Kwon (2002) defined social capital “as goodwill available to individual or groups”, and Lin (2000) defined social capital as “investment and use of embedded resources in social relations for expected return.” The overriding consensus among them is that relationship plays a central role in social capital formation, accumulation and generation of returns. Social capital is important in B2B relationship because it enables customers and suppliers to assess resources embedded in their relationships. Gordon and Cheah (2014) pointed out that mutually beneficial and long term B2B relationships are primarily based upon resources that are deeply embedded in the social capitals built between them (stakeholders). Essentially, B2B organizations invest in social capitals that are shared between them, so as to be able to focus on activating relational functions which allow them to synergistically exploit resources and skills for creation of positive outcomes, such as competitive advantage.

Jones and Taylor (2012) pointed out that there is a growing trend in extant research literatures in examining the value of B2B relationship between customers and suppliers in generation of commitment and customer loyalty. The research studies concluded that there is an increase of social capital translating into high degree of loyalty towards suppliers, when the relationships between customers and suppliers grow closer and develop sense of commitment towards suppliers. Mask and Works (2018) determined that social capitals embedded in close relationship tend to influence customer loyalty in supply chain integration. Furthermore, there have been a number of social relational

capital studies elaborate the effects of social capitals on commitment towards suppliers, and customer loyalty (Gordon & Cheah, 2014; Kang & Na, 2018; Jones & Taylor, 2012). Within the context of E&E manufacturing industry, trust, cooperation and communication are considered as important social capital resources that provide values, which are embedded in the relationships with customers. Suppliers processing these important social capitals enable customers to utilize the resources to develop new markets, technologies, and products more effectively. Gordon and Cheah (2014) pointed out that interactions between customers and suppliers establish a pattern of expectations base on norms of reciprocity and equity. Accordingly, reciprocating to the supports for social capital resources, namely trust, cooperation and communication, customers act in the way of commitment and loyalty toward the suppliers (Wyrwa, 2014).

Suppliers possessing high degree of trust, such as reliability, credibility, benevolent, competency, and integrity are valuable social capital resources that customers can rely on to safeguard their intellectual properties, co-develop products, and to prevent opportunism in relationships. Customers benefit from the social capital resource, namely trust, which is embedded in the relationships with suppliers. In similar way, suppliers can exploit the social capital resources, particularly commitment towards suppliers, and customer loyalty, which are embedded in the relationship with customers. For instance, Chen, Yen, Rajkumar, and Tomochko (2011) determined that customers benefit from suppliers with high degree of trust, such as integrity, trustworthiness, honestly, credibility, benevolent, and capable, that restrains opportunisms in the relationship between customers and suppliers. Accordingly, the suppliers gain social capital

resources, specifically customer commitment, embedded in the relationships with customers.

Cooperative relationship is important in high technology industry, which includes Malaysian E&E manufacturing industry. Cooperation is considered an important social capital resource that customers and suppliers can utilize to complement their own capabilities. Due to highly competitive business environment, and rapid technologies changes in the high technology industries, customers and suppliers have to rely more than their own capabilities to develop new markets, products, and technologies (Hertenstein & Williamson, 2018; Gordon & Cheah, 2014). Customers can utilize and benefit from the social capital resource, namely cooperation, embedded in the relationships with their suppliers. As customers interact over time, the relationships with suppliers become closer, and they (customers) experience the needs to reciprocate the supports and assistant provided by the suppliers in the form of commitment and customer loyalty. In similar way, suppliers exploit the social capital resources, specifically commitment towards suppliers and customer loyalty, embedded in relationship with the customers.

In the E&E manufacturing industry, coordination, anticipating, implementation, and control of changes are important aspects of production of products (Human and Naude, 2014). Communication plays critical role to ensuring that all stakeholders, who include customers, are informed about changes, decisions, and implementations. Customers benefit from the social capital resources, namely communication, from the relationship with suppliers, who are willing to share the vital information. Exchange of vital

information between customers and suppliers in the manufacturing industry provides numerous advantages, such as improve product designs, meet delivery schedules, reduce manufacturing lead time, reduce operation costs, streamline operations that minimize inventories, and increase speed to introduce new products to markets. Both customers and supplier benefit from the social capital resource, namely communication. In addition, suppliers is able exploit the social capital resources, specifically commitment towards suppliers, and customer loyalty, embedded in the relationship with customers.

In summary, social capital theory dwells on social capitals that are deeply embedded in the relationships between stakeholders. Mutually beneficial B2B relationships are based upon resources that are embedded in the social capitals developed between stakeholders. Essentially, customers and suppliers invest in social capitals shared between them so as to be able to focus on activating relational functions which allows them to synergistically exploit external resources and skills for creation of positive outcomes, such as competitive advantage.

Social capital theory is most suitable, and appropriate in the context of Malaysian E&E manufacturing industry, where trust, cooperation, and communication are considered as most important social capital resources that provide values to the Malaysian E&E manufacturing firms. Suppliers processing these important social capitals enable Malaysian E&E manufacturing firms to utilize the resources to develop new markets, technologies and products more effectively. Interactions between Malaysian E&E manufacturing firms and suppliers can establish a pattern of expectations base on norms

of reciprocity and equity. Accordingly, reciprocating the supports for social capital resources, namely trust, cooperation and communication, Malaysian E&E manufacturing firms act in the way of commitment towards suppliers, and customer loyalty. Suppliers can exploit these social capitals, namely commitment towards suppliers, and customer loyalty, embedded in the relationships with Malaysian E&E manufacturing firms. Hence, social capital theory is suitable and appropriately adopted in this study.

2.4 Research Framework

Based on the discussions of the concepts of relationship marketing and product differentiation, and two underpinning theories, namely social exchange theory and social capital theory, this study proposes the theoretical framework in Figure 2.1 depicting four predictors, mediator and dependent variable, and their linkages. The four predictors are product quality, trust, cooperation, and cooperation. The mediator and dependent variables are commitment, which is towards suppliers, and customer loyalty respectively.

Essentially, the theoretical framework illustrates two types of relationships between the four predictors, and customer loyalty. The first type of relationships involves the direct influences of four predictors toward customer loyalty. In this study, there are four relationships involving the direct influences of four predictors toward customer loyalty. The second type of relationships concerns the indirect influences of the four predictors on the customer loyalty via mediator of commitment. In this study, there are four relationships involving the indirect influences of product quality, trust, cooperation, and communication on customer loyalty via the mediator of commitment.

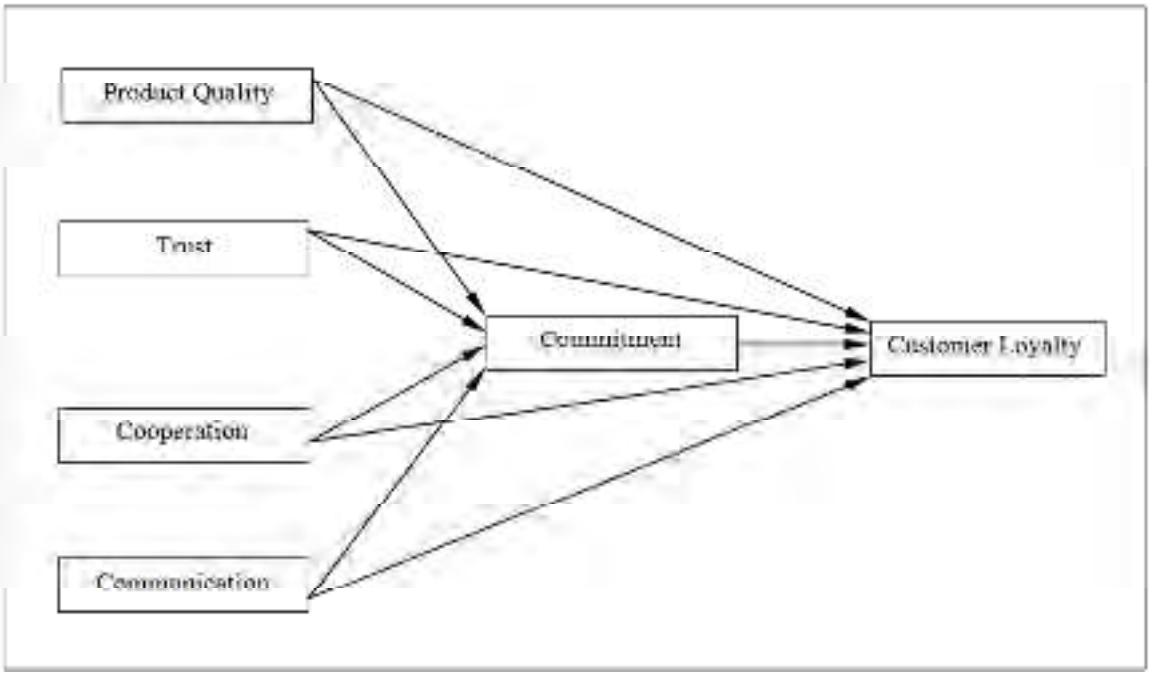

Figure 2.1

Theoretical framework

2.5 Customer Loyalty

Customer loyalty has been the subject of interest for academicians and practitioners for over 80 years. Loureiro and Kastenholz (2011), and Jones and Taylor (2007) affirmed that there are three main streams of studies emerged in the marketing studies, which consist of behavioral loyalty, attitudinal loyalty, and composite concept of customer loyalty. Behavioral loyalty concerns with aspects related to re-purchasing and re-patronage (Bowen & Shoemaker, 2003; Tucker, 1964; Zeithaml et al., 1996), and attitudinal loyalty involves aspects of positive associations with the products or suppliers, and willingness to recommend them to other customers (Berne, Mugica & Yague, 2001; Chaudhuri & Holbrook, 2001). According to Pearson (as cited in Rai, 2012), composite

concept of customer loyalty comprises both aspects of behavioral loyalty and attitudinal loyalty.

2.5.1 Types of Customer Loyalty

Behavioral loyalty is known to be the earliest stream of study, where it concentrates exclusively on behavior aspects, and interprets customer loyalty as re-patronage and repeat purchases (Zeithaml et al., 1996). Gil-Saura et al. (2009), and Kumar and Shah (2004) pointed out that customer loyalty definitely comprises more than behavioral aspects. According to Dick and Basu (1994), customer loyalty definition based on behavioral loyalty is not sufficient to differentiate the spurious loyalty and genuine loyalty. Meantime, Barnes (1997) pointed out that a loyal customer is willing to recommend the product or supplier to others, even though he does not purchase again. This type of customer loyalty is known as attitudinal loyalty, which is based on emotional and pyschological reasonings (Barnes, 1997; Dick & Basu, 1994; Yang, 2015).

According to Cheng (2011), relationship marketing studies on customer loyalty have been oscillating between behavioral loyalty and attitudinal loyalty. Akhter, Abbasi, Ali, and Afzal (2012) went further to propose a segmentation method, which has five possible outcomes, to identify the types of customer loyalty. Figure 2.2 shows the segmentation method and the five possible outcomes of committed, behaviorally, dubious, reducer and leaver. Accordingly, if a customer is known to be loyal, then the customer loyalty can be identified as committed or behaviorally. Committed is referring to attitudinal loyalty, where the customer has been using the products and has not plan to change in future, and

intends to recommend the products to others. Behaviorally is referring to behavioral loyalty, where the customer has been using certain products and declares to continue use the products. A disloyal customer can be dubious, reducer or leaver.

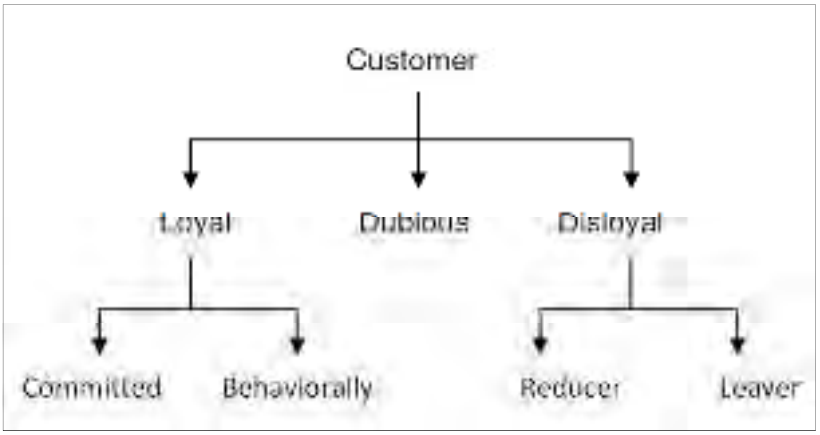

Figure 2.2

Segmentation approach for customer loyalty

Source: Akhter et al. (2012)

Bowen and Shoemaker (2003) commented that several relationship marketing studies were focusing on attitudinal loyalty and behavioral loyalty separately, even though each of the concepts have yet to fully accountable for all characteristics of customer loyalty. For instance, instead of exhibiting either attitudinal loyalty or behavioral loyalty, a customer may exhibit both behavioral loyalty and attitudinal loyalty at the same time. The customer re-purchases the same products, and recommends them to others (Chiu, Cheng, Huang, & Chen, 2013).

Chaudhuri and Holbrook (2001), and Dick and Basu (1994) attempted to link the concept of customer loyalty from a causal perspective. Customer loyalty is viewed as the strength

of the relationship between relative attitude and repeat re-patronage (Dick & Basu, 1994). Accordingly, the nature of relative attitude can be a strong indicator for behavioral loyalty. For instance, when a customer exhibits low attitude towards a product, he is not likely to repurchase it. Likewise, customer exhibiting strong attitude towards a product, he is likely to buy the same product again in future (Dick & Basu, 1994). Figure 2.3 shows the framework for the relationship between attitudinal loyalty and behavioral loyalty. However, several marketing relationship studies have found inconsistence findings with the causal concept of customer loyalty (Cheng, 2011; Kaur & Soch, 2013).

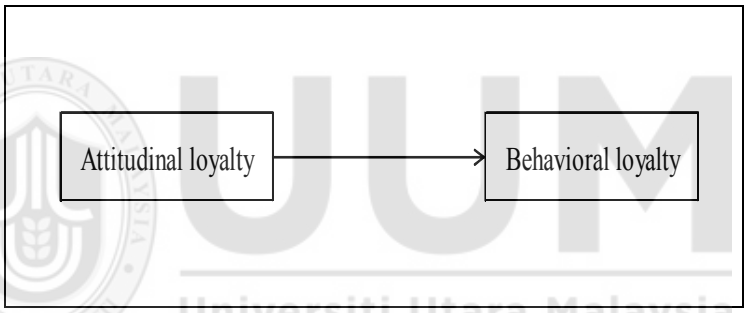

Figure 2.3

Causal perspective of customer loyalty

Customer loyalty based on composite concept emerges by reconciliation of attitudinal loyalty and behavioral loyalty dimensions. Loureiro and Kastenholz (2011) opined that the consolidation of both attitudinal loyalty and behavioral loyalty dimensions into the composite concept of customer loyalty has broadened the scope of customer loyalty, and able to account for all the characteristics of customer loyalty. Pritchard and Howard (1997) demonstrated that the composite concept of customer loyalty has wider scope, and has better predictive power for customer loyalty in relationship marketing studies. The

composite concept of customer loyalty has been applied and supported as a valuable tool to comprehend customer loyalty in several fields, such as retailing, recreation, logistics, airline, hospitality management, internet banking industry, fast moving consumer goods (FMCG) industry, and branding (Bowen & Chen, 2001; Garland & Gendall, 2004; Gil-Saura et al., 2009; Jacoby & Kyner, 1973; Malik, Naeem & Arif, 2011; Pritchard & Howard, 1997; Reynolds & Arnold, 2000; Sivadass & Baker-Prewitt, 2000; Tong, Wong & Lui, 2012; Zaman, Bibi, Arshad & Shahzad, 2012; Zhang, Fu, Cai & Lu, 2014).

2.5.2 Definitions of Customer Loyalty

Definition for the composite concept of customer loyalty is expected to include aspects of behavioral loyalty and attitudinal loyalty. Bowen and Shoemaker (2003), Vuuren et al. (2012), Tucker (1964), and Zeithaml et al., (1996) provided descriptions and definitions of behavioral loyalty, while Berne et al. (2001), Butcher, Sparks, and O'Callaghan (2001), Dick and Basu (1994), and Jeon and Choi (2012) offered descriptions and definitions for attitudinal loyalty.

Vuuren et al. (2012) defined customer loyalty as "a customer's likelihood to choose a particular product with reference to his past purchases." This definition captures behavioral loyalty aspects, where customer intends to make repeated purchases based on favorable past experiences. Zeithaml et al. (1996) described loyal customers have high purchase intention, less price sensitive, provide feedbacks, do more business with the preferred supplier. Accordingly, this definition of behavioral loyalty has included purchase intention and price tolerance, where loyal customer may accept price increase

within acceptable reasoning, and is less-price sensitive even though there is a cheaper alternative available. Bowen and Shoemaker (2003) described a loyal customer would return to make repeat purchases, buy more products and services, perform partnership activities, and simply re-patronizing the supplier, which are considered important aspects of behavioral loyalty. Tucker (1964) interpreted customer loyalty as a form of biased choice behavior towards a particular brand as manifested in the repeated purchases over time. Table 2.1 summarizes the descriptions of behavioral loyalty. The descriptions highlight common aspects of behavioral loyalty that are related to customer behavioral intention to re-buy and re-patronage certain products, and continue to do so in future despite alternatives are available and influences for switching.

Table 2.1

Descriptions of behavioral loyalty

Author(s)	**Behavioral loyalty**
Bowen and Shoemaker (2003)	Loyal customer would return to make repeat purchases, purchase more products and services, and perform partnership activities.
Tucker (1964)	A form of biased choice behavior towards a particular brand as manifested in the repeated purchases over time.
Vuuren et al. (2012)	As a customer's likelihood to choose a particular product with reference to his past purchase.
Zeithaml et al. (1996)	Loyal customers have high purchase intention, less price sensitive, provide feedbacks, and do more business with the preferred supplier.

Butcher et al. (2001) described attitudinal loyalty as enduring psychological attachment of customer towards a particular product or supplier. Accordingly, four types of psychological attachments are identified, which relate to advocacy of product or supplier, identification with the product or supplier, preference for the product or supplier ahead of others, and the tendency to resist switching. Jeon and Choi (2012) defined attitudinal loyalty as "the customer having intention to do business with the organization in the future and engaged in positive word of mouth communication about it". This definition involves aspects of intention, and positive word of mouth communication. Dick and Basu (1994) defined attitudinal loyalty as "customer's desire to continue relationship with the supplier in spite of the lower prices from alternative sources, and to recommend the products to his friends." Berne et al. (2001) described attitudinal loyalty as a customer's promised act which entails the likelihood of future purchases or reduce likelihood of changing to another product or supplier. Table 2.2 summarizes the descriptions of attitudinal loyalty. The descriptions pointed out the common aspects of attitudinal loyalty that are characterized by preference, commitment, advocacy, affiliation, intention, promised act, desire to continue relationship, and avoidance to switching.

Table 2.2

Descriptions of attitudinal loyalty

Author(s)	Attitudinal loyalty
Berne et al. (2001)	As a customer's promised act which entails the likelihood of future purchases or reduce likelihood of changing to another product or supplier.
Butcher et at. (2001)	As enduring psychological attachment of a customer towards a particular product or supplier.
Dick and Basu (1994)	As customer's desire to continue relationship with the supplier in spite of the lower prices from alternative sources, and to recommend the products to his friends.
Jeon and Choi (2012)	As the customer having intention to do the business with the organization in the future and engaged in positive word of mouth communication about it.

Pearson (as cited in Rai, 2012) consolidated the dimensions of behavioral loyalty and attitudinal loyalty into the composite concept of customer loyalty. Accordingly, Pearson (as cited in Rai, 2012) defined customer loyalty as "the mind-set of a customer, who hold a favorable attitude toward a company, commits to repurchase the company's products (or services), and recommends the products (or services) to others." The behavioral aspect is addressed by the definition, which states "…. commits to repurchase the company's products (or services), …." Attitudinal aspects are addressed in the definition, which specifies "….hold a favorable attitude toward a company….", and "…. recommends the products (or services) to others."

Loureiro and Kastenholz (2011) commented that composite-based customer loyalty can fully explain the concept of customer loyalty, since it has incorporated both attitudinal and behavioral aspects. In the relationship marketing studies, Pritchard and Howard (1997) demonstrated that the composite-based customer loyalty measurement has stronger predictive power for customer loyalty. In the E&E industry, Wittstruck and Teuteberg, (2012) reported that both the aspects of attitudinal and behavioral in customer loyalty play major influences on purchasing decision making. Therefore, this study adopts the definition of customer loyalty from Pearson (as cited in Rai, 2012), who states as "the mind-set of a customer, who hold a favorable attitude toward a company, commits to repurchase the company's products (or services), and recommends the products (or services) to others."

2.6 Commitment

Commitment is one of the oldest and most frequently studied variables in relationship marketing (Chowdhury, 2012; Kaur & Soch, 2013; Lariviere et al., 2014; Moorman et al., 1992; Morgan & Hunt, 1994; Mubarik et al., 2016; Sharma, Young & Wilkinson, 2015; Wu et al., 2014). The concept of commitment originates from industrial and organizational psychology (Moorman et al., 1992), and implies the intention to continue a course of action, such as maintaining a relationship with supplier (Mubarik, et al., 2016). Furthermore, Morgan and Hunt (1994) described that commitment implies customer to maintain a relationship by cooperating with supplier, avoid short-term gain in favor of long-term mutual benefits, and take calculative risks with the conviction that supplier will not take advantage for self-interest through opportunism. Lariviere et al. (2014) opined

that commitment as "a situation in which a firm fulfills precisely the agreed terms and conditions of the agreement with its counterparts."

Moorman et al. (1992) defined commitment as "an enduring desire to maintain a value relationship." The phase "enduring desire….." suggests that both customer and supplier want the relationship to sustain and willing to take actions to fulfill agreed terms, and conditions for the relationship to remain existence (Mubarik et al., 2016; Ulaga and Eggert, 2006a). In another words, commitment is meant for long term, and do not change frequently. Morgan and Hunt (1994) provided a compatible definition of commitment, which states "an exchange partner believing that an ongoing relationship with another is so important as to warrant maximum efforts at maintaining it; that is, the committed party believes the relationship is worth working on to ensure that it endures indefinitely." Another consistent version of definition of commitment provided by Dwyer, Schurr, and Oh (1987), which describes commitment as an implicit and explicit pledge of relational continuity between exchange partners. Gundlach and Murphy (1993) described the characteristics of commitment should be short-term sacrifice, stability, and loyalty. Additionally, Anderson and Weitz (1992) commented that the essence of commitment in relationship is stability and sacrifice.

Sharma and Irving (2005) classified commitment into four components, namely affective, normative, imperative, and calculative. Affective commitment is based on attachment to, identification with, or involvement in the supplier (Chang et al., 2012; Lariviere et al., 2014). Normative commitment refers to the perception of obligation to the supplier

(Bricci et al., 2016; Lumley, Coetzee, Tladinyane & Ferreira, 2011). Calculative commitment refers to staying in the relationship due to perceived lack of alternative, or perceived high switching costs (Chang, Chuang, Chuang & Lin, 2015; Lariviere et al., 2014), while imperative commitment involves rational determination of benefits arising from continuing the relationship (Otten-Pappas, 2013).

Sharma et al. (2005) and Lariviere et al. (2014) pointed out that there are differences in the conceptualization and operationalization of commitment, although the existence of the four components of commitment has been widely acknowledged by relationship marketing studies. Critique from Haghkhah, et al. (2013) suggested that commitment is mainly studied in B2B relationship as a global construct that measured the intention to continue relationship.

This study adopts the definition of commitment proposed by Moorman et al. (1992), which is defined as "an enduring desire to maintain a value relationship." Cater and Cater (2010), and Haghkhah et al., (2013) commented that this definition is conceptualized as a global construct, which has been commonly adopted for relationship marketing studies in B2B markets. Furthermore, other prevailing definitions (Anderson & Weitz, 1992; Dwyer et al., 1987; Gundlach & Murphy, 1993; Morgan & Hunt, 1994) are consistent with this definition of commitment, which states "an enduring desire to maintain a value relationship" (Moorman et al., 1992).

2.6.1 Relationship between Commitment and Customer Loyalty

Relationship marketing studies have demonstrated that commitment affects customer loyalty in several ways. Bricci, et al. (2016), Doma (2013), Omidinia, Matin, Jandaghi, and Sepahyar (2013), Salarzehi and Rahmaninejad (2013), and Susanta, Alhabsji, Idrus, and Nimran (2013) adopted a global construct for customer loyalty, and have shown the relationships between commitment and customer loyalty are positively significant. Mubarik et al. (2016) adopted a multidimensional construct for customer loyalty, which consisted of attitudinal loyalty and behavioral loyalty. The study determined that commitment has significant effects on both behavioral loyalty and attitudinal loyalty. Accordingly, they found that the effect of commitment on attitudinal loyalty was lower than behavioral loyalty. Kaur and Soch (2013) adopted attitudinal loyalty as predictor to behavioral loyalty, and determined that commitment has significant direct effect on attitudinal loyalty, and indirect effect on behavioral loyalty through altitudinal loyalty.

Kaur and Soch (2013) demonstrated that customer loyalty is positively affected by affective commitment, which develops the social bonding between customer and supplier. Chang et al. (2012) produced similar findings that that customer loyalty is influenced by affective commitment, when the dependency between the customer and supplier is neither too high nor too low. In between the two extreme dependency situations, customer and supplier emphasize more on affective commitment.

Wu, Zhao, and Wu (2012) determined calculative commitment has direct effect on customer loyalty. Ercis, Unal, Candan, and Yildirim (2012) complemented the finding

from Wu et al. (2012) by demonstrating that calculative commitment has significant effect on customer loyalty in a situation, where there are limited alternative sources. In the context of high technologies industries, where supplier jointly develops components with customers, Shruthi and Devaraja (2012) also determined that calculative commitment is an effective approach to gain customer loyalty. Accordingly, customer is locked-in or committed to the relationship due to specificity of the components for their product applications, and intends to stay loyal with the supplier in order to continue receiving the components (Shruthi & Devaraja, 2012).

Susanta, et al. (2013), and Damm and Rodriguez-Monroy (2011) demonstrated that commitment can influence customer advocacy, which is referred as the willingness to give strong recommendations or praise to other customer on behalf of the supplier. Mohsan, et al. (2011) opined that a true customer loyalty can be observed when customers become advocate of an organization. In the B2B context, Ramaseshan et al. (2013) commented that customer loyalty is not just about retaining customers for long-term, but also cultivate the relationships to encourage advocacy, and future purchases. To Han and Ryu (2012), customers with stronger level of commitment are indeed more willing to contribute as customer advocates.

Drawing from the findings from previous marketing relationship studies that demonstrated commitment has significant relationship with customer loyalty, this study hypothesizes that commitment has significant influence on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing

industry.

H1: Commitment has significant influence on customer loyalty

2.7 Product Quality

Despite quality is utmost important to competitive advantage, Juran and Defoe (2010) pointed out that practitioners and academicians have conflicting approaches to understand quality. Accordingly, Garvin (1984) summarized the approaches into five categorizes, which are the transcendent approach that evaluates quality as an innate excellence but cannot be defined precisely, product-based approach treats quality as precise and measureable variable, user-based approach evaluates quality according to intend use, manufacturing-based approach defines quality as conformance to specification, and value-based approach equates quality to value at acceptable price.

Garvin (1984) went further to formulate a framework of quality that consists of eight dimensions, which are performance, feature, reliability, conformance, durability, serviceability, aesthetics, and perceived quality. Descriptions of the eight dimensions of quality are summarized in Table 2.3. The eight dimensions provide two important functions. First, the eight dimensions can be used to explain differences between the five approaches of defining product quality. According to Garvin (1984), each approach of defining quality is known to have implicit focus on specific combination of quality dimensions. Garvin (1984) postulated that the product-based approach concentrates on performance, features, and durability, the user-based approach focuses on aesthetics and perceived quality; and manufacturing-based approach adopts the performance,

conformance and reliability. Secondly, the eight dimensions can be used for strategic purposes. According to Juran and Defoe (2010), a supplier does not need to utilize all the eight dimensions simultaneously, rather to select and focus on certain quality dimensions that are important to create competitive advantage.

Table 2.3

Descriptions of the eight dimensions of quality

Dimensions	**Descriptions**
Performance	Quality is assessed based on primary operating characteristics of product.
Features	Quality is assessed based on secondary characteristics of product that supplement the basic functioning.
Reliability	Quality is assessed based in the product's probability of failure-free performance over a specified duration.
Conformance	Quality is assessed based in the degree to which a product physical and characteristics meet specifications.
Durability	Quality is assessed based in the defined useful product life.
Serviceability	Quality is assessed by subjective measures, such as speed, courtesy, responsiveness and competence of repair.
Aesthetics	Quality is assessed based on matters of personal judgment and reflection of individual preferences, such as taste and smell.
Perceived	Quality is assessed based on subjective measurement, such as image, brand name, and advertised information.

Source: Garvin (1984)

Garvin (1984) pointed out that the manufacturing-based approach to defining quality is

prominent in B2B manufacturing industry. Accordingly, product quality can be defined as "conformance to specification" (Crosby, 1970). In the B2B manufacturing industry, it is common practice for customers to state specifications for suppliers to manufacture or supply the products. Products meeting the specifications are known as quality products, and allow to ship, and finally accept by customers. Products failing to conform to the specification are known as rejects, and are not accepted by customers. As such, the definition of conformance to specification ensures consistency of conformance, reliability and performance as receive by the customers. Conformance, reliability and performance are among the eight quality dimensions (Garvin, 1984). Therefore, this study adopts the definition of product quality, as "conformance to specification" (Crosby, 1979), which takes into account that suppliers provide the products with consistency in conformance, reliability, and performance.

2.7.1 Relationship between Product Quality and Customer Loyalty

Several marketing relationship and supply chain studies have proven that product quality has direct influence on customer loyalty (Asmayadi & Hartini, 2015; Bayraktar et al., 2012; Doorstar, Asil & Behrang, 2013; Ishaq et al., 2014). Long et al. (2013) provided evidence that product quality has influence on customer loyalty in manufacturing industry. Among the five quality dimensions of performance, reliability, features, durability, and perceived quality investigated, the study demonstrated that performance and reliability have the most significant effects on customer loyalty. The findings are consistent with Garvin's prediction (Garvin, 1984), where performance and reliability are among the three most important quality dimensions in manufacturing-based approach for

quality.

Using a multidimensional construct, which consisted of attitudinal loyalty and behavioral loyalty, Sadeghi, Mollahosseini, and Forghani (2014) determined that product quality has significant influence on both the attitudinal loyalty and behavioral loyalty, and product quality has higher degree of influence on attitudinal loyalty than behavioral loyalty. A logical explanation comes from Cheng (2011), and Mohsan et al. (2011), who commented that products with reputable quality have stronger impact on attitudinal loyalty than on behavioral loyalty.

Cater and Cater (2010) verified the relationship between product quality and customer loyalty in the B2B manufacturing industries. Their study determined that product quality has significant direct effect on attitudinal loyalty, and behavioral loyalty. Hayes (2013) analyzed the attributes that have the most impact on customer experiences in the E&E manufacturing industries. Their findings determined that product quality is the most important attribute influencing attitudinal loyalty, and the third most important attribute, after future products and communication, influencing behavior loyalty. In addition, Jahanshahi et al. (2011) pointed out that loyal customers mostly found in the categories of customers, who value or have utilized higher quality products.

Pan, Shang, and Xie (2012) found the relationship between product quality and customer loyalty is significant across many relationship marketing studies in B2B markets. Accordingly, a meta-analysis of empirical findings on the predictors of customer loyalty

was conducted on published articles from EBSCOHost and PyscInfo databases, Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior, AMA and ACR, and ELMAR listserv. The meta-analysis findings showed that product quality has strong influence on customer loyalty. Pan et al. (2012) further commented that the effect of product quality on customer loyalty is lower in B2B market compares to consumer market, but the effect becomes stronger over time. Akman and Yorur (2012) stated that creating a loyal B2B customer base is about maintaining numbers of customer over long period of time.

Drawing from the findings from previous studies, there are strong evidences that product quality is related to customer loyalty. Henceforth, this study hypothesizes that product quality has significant influence on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

H2: Product quality has significant influence on customer loyalty

2.7.2 Relationship between Product Quality and Commitment

Most of the B2B relationship literatures considered product quality as part of relationship benefits (Blocker, 2011; Chowdhury, 2012). According to Wahab (2011), relationship benefit is a multidimensional construct comprising of functional value and relational value. Function value includes product quality, reliability, responsiveness, and price, while relational value consisted of image, communication, trust, cooperation, and interdependent.

Chowdhury (2012) used the same reasoning to explain product quality. Accordingly, customers always want to buy products with high-quality to optimize their processes, and add values to the final products. In order to maintain the relationship commitment with customer, suppliers provide components with values, such as superior product quality, that are beneficial to customers. Customer commits to the relationship in order to continue receiving benefits associate with product quality (Akman & Yorur, 2012). Furthermore, Blocker (2011) argued that product quality is an essential element of relationship benefits for customers.

Lin and Huang (2013) pointed out that customer and supplier may jointly develop products during new product development (NPD) phases. As such, customers can lock-in or commit to the relationship, because it is difficult to replace the supplier or substituted the products without risking product quality at the manufacturing phase. Thus, product quality exhibits influencing role on commitment in the relationship. Molina-Castillo, Munuera-Aleman, and Calantone (2011) found similar product quality-commitment relationship, when customers are committed or locked-in with the supplier due to the interdependency and high switching cost for product quality.

Byun and Dass (2015) found that product recalls due to poor quality product has negative relationships with both affective commitment and calculative commitment. When there are product recalls due to quality lapses, both affective commitment and calculative commitments can reduce significantly. This effect provides evidence that product quality is related to commitment, although it demonstrates the negative consequent effects of

commitments with respect to product recalls resulted from quality lapse.

Exploring beyond B2B industry is necessary to find more supports for the linkage between product quality and commitment, since there is limited literature reporting the linkage in B2B relationship. Ziaullah, Feng, and Akhter (2014) found product quality is significantly related to commitment in the Chinese e-retailing market, while Gil-Saura, Ruiz-Molina, and Arteaga-Moreno (2011) provided evidences that logistic quality has direct impact on commitment in the B2C transportation industries.

The above arguments have provided evidences that product quality has effect on commitment. Henceforth, this study proposes the hypothesis that product quality has significant influence on commitment of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

H3: Product quality has significant influence on commitment

2.8 Trust

The rapidly changing business environments are forcing suppliers to seek more creative and drastic means for meeting competition (Ross, 2013). Accordingly, many of them respond to the competition by developing trusting relationships with customers. Vuuren et al. (2012) pointed out that such relationship is characterized by high degree of trust between the customer and supplier. The high degree of trust enables the customer and supplier to pay attention on working together to develop long-term mutual benefits, increase competiveness, and minimizing transaction cost. Thus, trust plays significant

role in building long-term relationship, and developing customer loyalty (Hofenk, Schipper, Semeijin & Gelderman, 2011).

Byun and Dass (2015) reported that trust is vital in time of financial crisis as well as in economically prosperous time. In turbulent times ranging from economic downturns to technology changes, trusted customer provides the needed supports for the supplier to ride out of the crisis. In economically prosperous times, at some point, a supplier may force to deal with unexpected events, such as product recalls. Fang et al. (2014) reported that trust can play crucial role to mitigate negative business impact. Accordingly, a trusting customer acts as a buffer to allow more time and leeway for the supplier to respond, fix, and prevent problems (Marimon, Yaya & Casadesus, 2011).

Although trust has been widely studied in relationship marketing, El-Manstrly (2016) highlighted that several key differences in ways trust is defined in literatures in B2B relationships. The first issue is related to identity of trustee. A few definitions refer trust as inter-personal trust between contact personnel from different organizations (Lippert & Swiercz, 2005; Ndubisi, 2011; Yava & Celik, 2010), while others refers trust as inter-organizational trust (Morgan & Hunt, 1994, Moorman et al., 1992; Anderson & Narus, 1990). This study adopts the former approach that views trust from inter-organizational perspective.

The second issue involves the scope of definition. Some of the definitions equate trust as the belief that trustees are reliable, credible, benevolent, and integrity (Anderson & Narus, 1990; Moorman et al., 1992; Morgan & Hunt, 1994). Other definitions associating

trust with perceived confidence benefit, which might help to reduce anxiety and increase comfort as a result of knowing what to expect (El-Manstrly, 2016). This study adopts the belief perspective, for which trust has two important elements related to the extent one party think the other is credible, competent, and reliable to compete the job, requirement or promise, and the belief in the good intention, benevolent, and integrity of one party towards the other (Ganesan, 1994; Kumar, Scheer & Steenkamp, 1995; Moorman et al., 1992).

Moorman et al. (1992) defined trust as "a willingness to rely on an exchange partner in whom one has confidence." This definition encompasses two general aspects. The first aspect views trust as a belief or expectation of the trustee's capability, credibility, reliability, integrity, and competency. The second aspect involves behavior intention to depend on the trustee, which might involve certain degree of vulnerability and uncertainty. Moorman et al. (1992) explained that both the belief and behavioral aspects must be present in order for trust to exist in the relationship. This definition is consistent with Morgan and Hunt's (1994) version of definition for trust, which also incorporates the two general aspects of belief and behavioral intention. Taking the belief and inter-organizational perspectives into consideration, thus, this study adopts the definition of trust proposed by Moorman et al. (1992), which states "a willingness to rely on an exchange partner in whom one has confidence."

2.8.1 Relationship between Trust and Customer Loyalty

Several relationship marketing studies have demonstrated that trust must be present in

order to develop customer loyalty (Chen et al., 2011; El-Manstrly, 2016; Iglesias, Markovic, Bagherzadeh & Singh, 2018; Vuuren et al., 2012; Wu, Weng & Huang, 2012). Mubarik et al. (2016) have confirmed the present of trust in B2B relationship can directly affect customer loyalty. Accordingly, it determined that both the dimensions of customer loyalty, namely attitudinal loyalty and behavioral loyalty, are directly influenced by trust. In the attempt to investigate why an optometric firm was unable to retain customers, Vuuren et al. (2012) conducted a study to investigate the effects of satisfaction, trust, and commitment on customer loyalty. Although satisfaction has significant effect on customer loyalty, Vuuren et al. (2012) emphasized that trust and commitment are significant influences on customer loyalty. In order to develop loyal customer, therefore, the optometric firm should not ignore commitment and trust while it was attempting to satisfy customers (Vuuren et al., 2012). Similar investigation was conducted by Ahmed (2013) to determine the effects of satisfaction, trust and commitment on customer loyalty in an Egyptian B2B shipping sectors. Satisfaction, trust, and commitment were found to have significant direct effects on customer loyalty, and Ahmed (2013) went further to discover that trust is the most important factor that accounts more than 19 percent of the total variance of customer loyalty in the study.

In the insurance B2B industries, trust is determined to be an influential factor toward customer loyalty. Accordingly, Salarzehi and Rahmaninejad (2013) determined that trust, commitment, and satisfaction have direct influences on customer loyalty. While in the franchising industries, McDonnell at al. (2011) found similar direct influences of satisfaction, trust, cooperation and commitment on customer loyalty. They further

discovered that trust has significant influence on cooperation too.

Susanti (2013) distinguished the effects trust in brand, and trust in supplier toward customer loyalty in the B2B branding. Trust in brand dominantly influences attitudinal loyalty, while trust in brand and trust in supplier directly influences re-purchase intentions. Accordingly, Susanti (2013) emphasized that both trust in brand and trust in supplier should be optimized to influence customer attitudinal loyalty, and re-purchase intentions.

Judging from the above arguments, there are strong evidences supporting trust has significant effect on customer loyalty. Therefore, this study proposes the hypothesis that trust has significant influence on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

H4: Trust has significant influence on customer loyalty

2.8.2 Relationship between Trust and Commitment

Several relationship marketing studies have determined the trust-commitment relationship is significant (Chao, Yu, Cheng & Chuang, 2013; Jiang, Henneberg & Naude, 2011; Velazquez, Gil-Saura & Molina, 2011). Velazquez et al. (2011) determined that the continuity of a business relationship in B2B travel industries is dependable upon the ability to develop the relationship between trust and commitment. Jiang et al. (2011) determined that trust-commitment relationship plays crucial role in maintaining business relationship in construction industries. Chao et al. (2013) validated the trust-commitment

relationship exists in the medical device supply industries.

Schiele, Veldman, Huttinger, and Pulles (2012) pointed out that trust can lead to higher degree of commitment. According to the social exchange theory, the causal trust-commitment relationship can occur through the concept of generalized reciprocity (Walumbwa et al., 2011). Customer and supplier evaluate economic and relationship outcomes from their interactions, and compare them to what they should deserve. If the economic and relationship outcomes have more benefits, then the customer and supplier decide to stay in the relationship. Mutual benefits can be generated through trust in the relationship (Beal & Sabadie, 2018; Chen et al., 2011; El-Manstrly, 2016; Kaur & Soch, 2103). Accordingly, Schiele et al. (2012) pointed out that customers make commitment to the relationships when the benefits outweigh risks.

On the basis of social exchange theory, Chen et al. (2011) demonstrated that trust has direct effect on commitment through the study of investment of specific asset in supply chains. Accordingly, specific asset investment can be subjected to the partner's opportunistic behavior unless trust and commitment exist in the relationship (Chao, Yu, Cheng & Chuang, 2013; Sambasivan et al., 2011; Wu et al., 2015). Chen et al. (2011) determined that the trust-commitment relationship is significant, and described trust helps effectively in joint decision-making and problem solving between customer and supplier, while commitment enables willingness of the customer and supplier to contribute efforts toward positive mutual benefits. Both trust and commitment have effectively restrained opportunistic behaviors in the relationship (Chao et al., 2013; Chen et al., 2011;

Sambasivan et al., 2011; Wu et al., 2015).

Morgan and Hunt (1994) developed the commitment-trust theory of relationship marketing by utilizing the relationship of trust and commitment as the key variables. The trust-commitment relationship is not only existed, it is also used as the key mediating variables for five predictors of termination cost, relationship benefit, shared value, communication and opportunism, and five outcome variables of acquiescence, propensity to leave, cooperation, functional conflict, and uncertainty (Morgan & Hunt, 1994). In the attempt to verify the key mediating variable model, Wu et al. (2012) confirmed that the relationship between trust and commitment is significant in the Taiwan high-tech industries. The finding determined that higher level of trust leads to greater degree of commitment. Wu et al. (2012) pointed out that high-tech industries are characterized by high risks associated with uncertainties from the changing external environment, and with the presence of trust, partnering high-tech customers have higher intention to commit to the relationship and willing to take more business risks. Therefore, the relationship between trust and commitment is significant, and it is necessary to nurture this relationship in the high-tech industries.

Based on the arguments above, there are evidences that trust has significant influence on commitment. Henceforth, this study proposes the hypothesis that trust has significant influence on commitment of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

H5: Trust has significant influence on commitment

2.9 Cooperation

A supplier's competitiveness relies more than its own capabilities to develop resources, technologies, and skills (Hong & Snell, 2013). Equally important is the relationship with customer through which new capabilities are co-developed through cooperation According to Hong and Snell (2103), the ability to gain such value from the relationship, to a large extent, depends on how cooperative between the customer and supplier. Wu et al. (2015) went further to point out that a cooperative relationship can be competitive advantage for the customer and supplier, because the specificity of relationship is not easy to imitate by their competitors.

Cooperation implies that customer and supplier need to sacrifice some immediate benefits to the relationship in order to gain larger benefits in the future (Kim, Kim, Pae & Yip, 2013). For instance, a customer needs to share certain proprietary printed circuit board (PCB) design to the PCB supplier, who has the capability to prototype and manufacture the PCB. Cooperation also implies that customer and supplier work together in the relationship to achieve mutual goals. In the same example, both customer and PCB supplier are working to develop and manufacture the PCB for the new medical device, which the customer anticipates strong demands. Customer gains profitability from the sales of medical devices, and PCB supplier gains profitability from the sales of PCB to the customer.

Cooperation can then be defined as "similar or complementary coordinated actions taken by firms in interdependent relationship to achieve mutual or singular outcomes with

expected reciprocation over time" (Anderson & Narus, 1990). This definition implies that cooperation is nurtured over long period of time, and consists of many coordinated efforts from the customer and supplier to achieve mutual benefits. The customer and supplier are concerned not about itself only, but also about the welfare and interests of each others. In the cooperative relationship, cooperation emphasizes that customer and supplier work together jointly and being flexible in response to changing situations or to accommodating each other's needs, in order to achieve mutual benefits (Cannon and Perreault, 1999).

Brito, Brito, and Hashiba (2014) described cooperation as the joint activity between customer and supplier to accomplish mutual compatible goals that would otherwise be unfeasible or costly. An interesting point of this description is that both customer and supplier should have compatible values. For instance, the PCB supplier has the manufacturing capability, which complements the customer's product technologies for medical devices.

Lewin and Johnston (1997) provided another version of definition for cooperation. They defined cooperation as "coordinated actions taken by parties to achieve mutual outcomes". According to Lewin and Johnston (1997), cooperation is proactive actions because the participating customer and supplier are actively agreeing to work together to achieve business goals. Although the definition is straightforward and easy to understand, it is lacking details on the reciprocation of rewards for the participating customer and supplier in the long term (Anderson & Narus, 1990).

Cannon and Perreault (1999) viewed cooperation from the perspective of cooperation norms that customer and supplier demonstrate in working together to achieve mutual and individual goals jointly. Cooperative norms involves expectations that both customer and supplier behave and act in a way that they understand and must work together to make the relationship beneficially and successful. In cooperative relationship, both customer and supplier should behave and act flexible in response to changes and to accommodate each other's needs, and resolving problems with joint efforts and responsibility, in order for them to attain mutual benefits, or to achieve individual goals jointly. Ramaseshan et al. (2013) reported that cooperative norms are relevant in the B2B cooperative relationship. Therefore, this study adopts the definition of cooperation as "similar or complementary coordinated actions taken by firms in interdependent relationship to achieve mutual or singular outcomes with expected reciprocation over time" (Anderson & Narus, 1990), which takes into account the cooperation norms of flexibility and joint efforts (Cannon & Perreault, 1999).

2.9.1 Relationship between Cooperation and Customer Loyalty

Several relationship marketing studies demonstrated that cooperation has significant influence on customer loyalty (McDonnell et al., 2011; Pecinova, Loctakova & Brancka, 2013; Wu et al., 2015; Yang, Chen & Chien, 2014; Zakaria, Jusoh, Ghazali & Johar, 2016). Pecinova et al. (2013) demonstrated that cooperation can positively affect customer loyalty. According to their argument, a supplier cooperates by investing in the relationship to be able to effectively create highest possible perceived value for customer. In return, the supplier gains reciprocity benefits, in term of long term business stability,

growth and profitability. Accordingly, both customer and supplier stay loyal to this cooperative relationship (Yang et al., 2014). As such, cooperation is an important predictor to customer loyalty.

McDonnell et al. (2011) emphasized the important to maintain cooperative long term relationship. In the study on franchisee loyalty toward franchisor, they determined that a highly cooperatively relationship creates high level of loyalty toward franchisor. Yang, et al. (2014) found similar highly cooperative environment has significant influence on customer loyalty. Accordingly, when the relationship was highly cooperative, their finding indicated high degree of customer loyalty existed toward the supplier. Yang et al. (2014) emphasized that cooperation is a crucial factor that affected customer loyalty, and should be emphasized in the business relationship.

In the efforts to investigate why a firm has difficulty to retain customers, Zakaria et al. (2016) investigated, and determined that cooperation, satisfaction, communication and trust have significant effects on customer loyalty. Although satisfaction was a significant factor, cooperation, trust and communication also exerted high degree of influence on customer loyalty. Zakaria et al. (2016) emphasized that the firm should also cultivate trust, cooperation and communication, while it attempted to satisfy customers. McDonnell et al. (2011) discovered similar findings that trust, cooperation, and communication have direct influences on customer loyalty in the franchising industries. Wu et al. (2015) pointed out that commitment has stronger association with cooperation and customer loyalty compared with trust, when customer committed investment of

specific asset in the relationship. Wu et al. (2015) further demonstrated that the commitment bound the customer and supplier, which cooperated to maintain the relationship that eventually created customer loyalty. Thus, commitment and cooperation are the two important factors that influence customer loyalty.

In summary, the previous studies have provided amble evidences to demonstrate the relationship between cooperation and customer loyalty is significant. Therefore, this study proposes the hypothesis that cooperation has significant influence on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

H6: Cooperation has significant influence on customer loyalty

2.9.2 Relationship between Cooperation and Commitment

There are few relationship marketing studies reporting on the relationship between cooperation and commitment, where cooperation acts as antecedent to commitment. (Cater & Cater, 2010). Nevertheless, Sharma et al. (2015) pointed out that value-based commitment can increase in conjunction with cooperativeness between customer and supplier, who received greater values from working together. They argued that customer and supplier in highly cooperative relationship develop a sense of moral obligation to continue the relationship. When sense of moral obligation exists in the cooperative relationship, both the customer and supplier are more inclined to commit to the relationship (Barraud-Didier, Henninger & Akremi, 2012; Sharma et al., 2015).

Hutchinson, Singh, Svensson, and Mysen (2012) argued that cooperation is a distinct dimension of relationship quality, which comprises of ten inter-related dimensions of continuity, satisfaction, trust, commitment, opportunism, cooperation, coordination, formalization, dependence, and specific assets. They concluded that cooperation is not only a distinct dimension, it is also correlated with the other nine dimensions of marketing relationship quality, which includes commitment.

Judging the above arguments, there are evidences that cooperation is related to commitment. Henceforth, this study proposes the hypothesis that cooperation has significant influence on commitment of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

H7: Cooperation has significant influence on commitment

2.10 Communication

According to Sohail (2012), communication refers to the process of sharing meaningful information between customer and supplier. Accordingly, Dimyati (2015) pointed out that the process of communicating can be carried out formally through official communication channels, or occurred through informal interactions, such as meeting, and conversations. Dimyati (2015), Graca, Barry, and Doney (2015), Krause and Ellram (1997), and Sohail (2012) reported that both formal and informal modes of communication play significant roles in B2B business decision making.

Human and Naude (2014) pointed out that timely input is vital to the customer and

supplier for planning, anticipating changes, and implementation. Correspondingly, Abdullah and Musa (2014) reported the important of timely and meaningful information, such as information quality and information availability, for customer and supplier to be effective in supply chain planning and supply chain integration. In the supply chain quality management, Xu (2011) stressed the important of sharing meaning information, such as proprietary information, between customer and supplier to optimize the supply chain performance.

Anderson and Narus (1990) defined communication as "the formal as well as informal sharing of meaningful and timely information between firms." The definition implies that exchange of information between customers and suppliers occur in timely and meaningful manner. In B2B relationship, Ramaseshan et al. (2013) agreed that frequent and timely exchange of information is vital to maintain contact with key personnel, particularly customers. According to Anderson and Narus (1990), communication is not confined to official communication channels only. Hughes, Le Bon, and Malshe (2012) concurred that meetings often involve important informal information exchanges that may not be available through formal communication.

Ndubisi (2007) referred communication in relationship marketing as "the maintenance of contract with customers, setting up reliable information at specific time, and proactively communicate in the event of problems." This definition is consistent with Anderson and Narus's (1990) definition for communication. Ndubisi (2007) elaborated that communication should include maintaining contacts with customers through various

means of information exchange channels, be it formally or informally.

Mohr and Spekman (1994) pointed out that sharing of meaningful information is an essential part of communication. Meaningful information should include information quality, such as accuracy and relevancy, which enables customer and supplier to react, and resolve business issues (Zillmann & Brosius, 2012). Mohr and Spekman (1994) reiterated that effective communication involves meaningful information exchange between customer and supplier. Therefore, this argument is aligned with Anderson and Narus's definition (Anderson & Narus, 1990) for communication.

Thus, this study adopts the definition provided by Anderson and Narus (1990), which states that communication as "the formal as well as informal sharing of meaningful and timely information between firms." In B2B relationship, exchange of meaningful information occurs frequently and timely between customer and supplier. For the relationship to be beneficial, timely and meaningful information, such as accuracy, adequacy, reliability, credibility, and understandability of exchanged information, are very important to the customer and supplier (Chen et. Al., 2011). Communications does happen formally and informally among the customer and supplier in B2B context (Hossain & Chonko, 2018; Krause & Ellram, 1997, Ramaseshan et al., 2013).

2.10.1 Relationship between Communication and Customer Loyalty

Akman and Yorur (2012) pointed out that customer loyalty can be influenced by open and frequent communication. Accordingly, they demonstrated that customer loyalty can

be developed by frequent information exchange and open communication with the customer. Vaerenbergh, Lariviere, and Vermier (2012) determined that open communication is effective in the process recovery from quality setbacks. Accordingly, supplier can gradually regain confident and customer loyalty by frequent updating of information pertaining to the actions taken to remedy the problems. Koniewski (2012) pointed out that product recall can establish and maintain brand loyalty, when handles responsibility through effective communication with stakeholders.

Nozhatzadeh, Hessamfar, and Ahmadi (2015) determined that communication can affect customer loyalty with intelligence information system, where personnel can access to the current and quality information instantly. Zheng, Zhao, and Stylianou (2013) discovered similar findings that information quality and the information system plays critical role to increase customer satisfaction, which ultimately affected customer loyalty to the relationship. Mithas, Tafti, Bardhan, and Goh (2012) reported that the effective use of information technology system can improve customer loyalty, and at the same time boosting profitability through the positive effects of customer loyalty, cross selling and reducing marketing costs. Intelligence information system with fast interactions, uncluttered and easy-to-navigate websites with quality searching capability is more preferable by customers, who have tendencies to utilize the system for repurchasing in the future (Dushyenthan, 2013).

Ndubisi (2011) demonstrated that customer loyalty can be maintained with mindfulness and proactive communication in handling conflicts, where reliable and accurate

information are crucial to customers. Correspondingly, Jefri, Ahmadi, and Fatehpoor (2013) verified that customer loyalty is affected by frequent, reliable, and proactive communication. Mustafa (2011) went further to demonstrate that reliable and accurate information can indirectly affect customer loyalty through the effects of satisfaction and trust.

Janita and Miranda (2013) studied the effect of communication towards customer loyalty in the B2B e-marketplace. The study determined that communication has significant effect on customer loyalty. Four key aspects of communication, namely, timeliness, reliability, credibility and trustworthiness of information that enable effective utilization of information from the website, are found critical to the development of customer loyalty in the B2B e-marketplace. Moreover, Manenti (2010) commented that the deployment of B2B e-commerce to improve customer loyalty can be less effective, if the complete, accurate, up to date, and consistence information are not readily available to the customers.

Previous studies provide evidences to support the relationship between communication and customer loyalty is significant. Therefore, this study hypothesizes that communication has significant influence on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

H8: Communication has significant influence on customer loyalty

2.10.2 Relationship between Communication and Commitment

According to Saleh, Ali & Mavondo (2014), open communication is crucial in international B2B business. Accordingly, they determined that the more open the communiation between customer and supplier, the greater the customer commitment to the relationship. Open communication includes keeping each other informed on changes, information of mutual benefit about events and changes in the market, and when day-to-day problems arrise (Brianchi & Saleh, 2011; Saleh et al., 2014). Such acts of ensuring information availability and information quality play significant role in the development of trust and commitment in the relationship (Chen et al. 2011).

In the information technologies (IT) industries, Park, Lee, Lee, and Truex (2012) demonstrated that communication, particularly from IT experts, can effectively promote customer commitment in the relationship. Trust and commitment development depends on a large part of communication process involving signaling to each others, consequent interpretations, responses, and agreeing (Sharma et al., 2015). As such, meaningful information exchange between the customers and supplier personnel is vital to the decision making for commitment to the investment.

Information quality, information availability and information sharing are important to the development of trust and commitment in relationship marketing (Chen et al., 2011). Accordingly, Chen et al. (2011) demonstrated that information quality and information availability have direct significant influences on trust, while information sharing has direct influence on commitment. Fawcett, Jones, and Fawcett (2012) supported the

findings that information sharing involving exchanging vital information, such as proprietary and private data, is deemed as an important commitment to work with trusted partners. Additionally, Zeffane, Syed, and Ryan (2011) commented that sharing of vital information is important in creating commitment.

According to Williamson (2008), opportunism occurs when there is asymmetric of information, and supplier takes advantage of the situation for self-interest. Accordingly, communication can reduce the information asymmetric, when the customers are kept abreast with the current information by the supplier. This argument is supported by Kang and Jindal (2015), and Brianchi and Saleh (2011), who demonstrated that effective and frequent communication develops social bond and trust-commitment relationship that are essential to curtail opportunism. Saleh et al. (2014) substantiated that effective and open effective communication reduce asymmetric of information between customer and supplier, and enables both customer and supplier to make commitment to the relationship. Wu et al (2015) also found communication in a cooperative relationship that can improve commitment, and reduces opportunism in the specific asset investment.

Based on the above arguments, there are amber evidences that communication and commitment is significantly related. Therefore, this study hypothesizes that commitment has significant influence on commitment of Malasyian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

H9: Communication has significant influence on commitment

2.11 Mediating Effects of Commitment

It is widely held that commitment plays important mediating role to enabling successful business relationship (Amani, 2015; Benouakrim & Kandoussi, 2013, Cater & Cater, 2010; Human & Naude, 2014; Morgan & Hunt, 1994; Kaur & Soch, 2013). Within the context of E&E manufacturing industry, value proposition is important in business relationships, as customers are willing to work and make commitment to suppliers who can offer values that are critical to their operations. Customer commitment is important to suppliers because of its important influence on customer loyalty (Kim et al., 2018; Warren, Lubbe, & Roberts-Lombard, 2018; Dikcius, Kirse, Casas & Koncanina, 2019). Due its linkages to both predictors, such as product quality, trust, cooperation, and communication, and customer loyalty, commitment plays important role in mediating the relationship between the predictors and customer loyalty. Moreover, Morgan and Hunt (1994) identified commitment as one of the key mediating variable in business relationships. This study adopts the perspective that commitment mediates relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty in the Malaysian E&E manufacturing industry.

2.11.1 Mediating Effect of Commitment on the Relationship between Product Quality and Customer Loyalty

Crosby (1979) defined product quality as "conformance to specification." Products are accepted and delivered to customer, when they meet the requirements in the specifications. It implies that product quality has consistency in conformance, reliability

and performance, which can generate benefits to customers (Chang et al., 2015). Drawing on the social exchange theory, product quality can affect commitment and customer loyalty through the value proposition concept. Customers assess the cost and benefits receive from product quality, and commits to the relationship when they determine that their operations benefit from values associate with product quality. Committed customer become loyal to the suppliers in order to secure supply of the products, and to continue receiving the benefits associate with product quality (Shiau and Lao, 2012; Walumbwa et al., 2011).

Commitment plays critical role in any successful marketing relationship. According to the key mediating variable model proposed by Morgan and Hunt (1994), commitment has important mediating effect on the relationship between relationship benefits and elements of customer loyalty, such as acquiescence. As such, commitment can mediate the relationship between product quality and customer loyalty, since product quality is an essential aspect of relationship benefits for customer (Blocker, 2011).

The above arguments provide sufficient evidences that commitment mediates the relationship between product quality and customer loyalty. Therefore, this study proposes the hypothesis that commitment of the Malaysian E&E manufacturing firms toward their suppliers significantly mediates the relationship between product quality and customer loyalty.

H10: Commitment significantly mediates the relationship between product quality and customer loyalty

2.11.2 Mediating Effect of Commitment on the Relationship between Trust and Customer Loyalty

According to key mediating variable model proposed by Morgan and Hunt (1994), trust and commitment are juxtaposed to mediate the impact of relationships. There have been many developments in relationship marketing, since the model was introduced in 1994 (Reddy & Chalam, 2013; Vivek, Beatty & Morgan, 2012). Tsai (2011) commented that the model needs modification when it applies to brand management. Accordingly, the study demonstrated that commitment does not juxtapose with trust to exercise the mediation effect, only commitment stood out as key mediator. Bricci, Fragata, and Antunes (2016) found similar effect, where trust does not juxtapose with commitment to exercise mediating effect, in the B2B distribution sector. Commitment functions as important construct leading to customer loyalty, while the effect of trust on customer loyalty is mediated by commitment.

Drawing on the social exchange theory, Schiele, et al. (2012) demonstrated that trust generates relationship benefits for the customer to stay committed in the long term relationship. Similarly, Hsu, Wang, and Chih (2013) demonstrated trust can lead to high degree of commitment, which in turn affects customer loyalty (Bricci, et al., 2016; Salarzehi & Rahmaninejad, 2013; Susanta et al., 2013; Vuuren, et al., 2012). Moreover, Kaur and Soch (2013) determined that commitment has significant mediating effect on the relationship between trust and customer loyalty, while Amani (2015) reported partial mediating effect of commitment on the relationship between trust and customer loyalty.

The above argument provides strong evidences that commitment mediates the relationship between trust and customer loyalty. Henceforth, this study proposes the hypothesis that commitment of Malaysian E&E manufacturing firms toward their suppliers significantly mediates the relationship between trust and customer loyalty.

H11: Commitment significantly mediates the relationship between trust and customer loyalty

2.11.3 Mediating Effect of Commitment on the Relationship between Cooperation and Customer Loyalty

Brito et al. (2014) pointed out that customer and supplier are often willing to engage in cooperative behavior in order to continue a mutually beneficial and loyal relationship. Accordingly, the degree of commitment is high, when the customer and supplier cooperate to create mutual benefits. Sharma et al. (2015) pointed out that customer and supplier in highly cooperative relationship develops a sense of moral obligation or normative commitment, which in turn leads to loyalty to the relationship. Furthermore, Bataineh, Al-Abdullah, Salhab, and Shoter (2015) found that cooperation can indirectly influence customer loyalty through the effect of commitment.

Drawing on the social exchange theory, Pecinova et al. (2013) demonstrated that cooperation generates relationship benefits for the customer and supplier, who commit to the cooperative relationship. Sharma, et al. (2015) demonstrated that cooperation can significant affect commitment, which in turn affects customer loyalty (Bricci, et al., 2016; Salarzehi & Rahmaninejad, 2013; Susanta et al., 2013; Vuuren, et al., 2012). Moreover,

Cater and Cater (2010) demonstrated that the relationship between cooperation and customer loyalty is mediated by affective commitment, while Benouakrim and Kandoussi (2013) emphasized the important of commitment as mediating variable governing the relationship between cooperation and customer loyalty.

The above arguments have provided supports that commitment mediates the relationship between cooperation and customer loyalty. Henceforth, this study proposes the hypothesis that commitment of the Malaysian E&E manufacturing firms toward their suppliers significantly mediates the relationship between cooperation and customer loyalty.

H12: Commitment significantly mediates the relationship between cooperation and customer loyalty

2.11.4 Mediating Effect of Commitment on the Relationship between Communication and Customer Loyalty

Chen et al. (2011) argued that communication is an important factor in determining customer's willingness to partner with the supplier. Accordingly, if customer can derive benefits from information sharing with a supplier, the customer is likely to commit to the relationship. Dimyati (2015) supported this argument by demonstrating that marketing communication, which is the seller-buyer communication activities, has strong influence on the customer's purchasing decision making process. Lee, Noh, and Kim (2013) pointed out that providing the information services to customer represents a mean to build relationship that can leverage to foster customer commitment toward the supplier

that provides the information sharing services, and this relationship commitment can serve as foundation for developing customer loyalty.

Abdullah and Musa (2014) commented that suppliers in a committed relationship gain access to marketing information, which enables them to better serve the market, develop supply chain, solve problems, and select customers. Dimyati (2015) pointed out further that customer in a relationship requires relevant up to date market and product information, better offers, and payment terms. Because both customer and supplier gain benefits from each other, they have stronger motivation to build, maintain and develop the relationship through commitment initiatives, which subsequently fostered customer loyalty. Therefore, mutual commitment is the foundation for the relationship. Furthermore, Human et al. (2014) reported that there is a significant relationship between communication and altitudinal loyalty, and commitment partially mediates the relationship between communication and attitudinal loyalty.

Based on these findings and agreements, there are evidences that commitment significantly mediates the relationship between communication and customer loyalty. Henceforth, this study proposes the hypothesis that commitment of the Malaysian E&E manufacturing firms toward their suppliers significantly mediates the relationship between communication and customer loyalty.

H13: Commitment significantly mediates the relationship between communication and customer loyalty

2.12 Summary of Hypotheses

A total of 13 hypotheses are developed with supporting evidences from relevant research literatures. Nine research hypotheses are related to direct relationships between four predictors, namely product quality, trust, cooperation, and communication, toward customer loyalty and commitment respectively, and between commitment and customer loyalty. Four research hypotheses are related to indirect relationships between the four predictors, namely product quality, trust, cooperation and communication, toward customer loyalty via the mediating effects of commitment. A summary of the 13 hypotheses are compiled in Table 2.4.

Table 2.4

Summaries of hypotheses

	Hypotheses
H1:	Commitment has significant influence on customer loyalty
H2:	Product quality has significant influence on customer loyalty
H3:	Product quality has significant influence on commitment
H4:	Trust has significant influence on customer loyalty
H5:	Trust has significant influence on commitment
H6:	Cooperation has significant influence on customer loyalty
H7:	Cooperation has significant influence on commitment
H8:	Communication has significant influence on customer loyalty
H9:	Communication has significant influence on commitment
H10:	Commitment significantly mediates the relationship between product quality and customer loyalty
H11:	Commitment significantly mediates the relationship between trust and customer loyalty
H12:	Commitment significantly mediates the relationship between cooperation and customer loyalty
H13:	Commitment significantly mediates the relationship between communication and customer loyalty

2.13 Chapter Summary

This chapter begins with reviews of the concepts of relationship marketing and product differentiation, and two underpinning theories. A research framework is developed based on the concepts of relationship marketing and product differentiation, and two underpinning theories, namely, social exchange theory and social capital theory. The research framework identifies product quality, trust, cooperation and communication as predictors, commitment as mediator, and customer loyalty as dependent variable, and their relationships, and two types of relationships, namely direct relationships toward customer loyalty, and indirect relationships toward customer loyalty via mediator of commitment. Extensive reviews of research literatures have identified suitable definitions for dependent variables of customer loyalty, predictors of product quality, trust, cooperation and communication, and mediating variable of commitment, and the relationships between the variables. To test the relationships between the variables, a total of 13 hypotheses have been developed in this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the research methodology for testing hypotheses, which are developed in Chapter Two. The research methodology includes development of research design, sampling design, operationalization and measurement of variables, development of measurement instrument, pre-test and pilot study, data collection approach, data screening for missing values, multiple inputs and illegible entries, errors in normality distribution, non-response bias, common method bias, multicollinearity, data analysis methods and mediation effect analysis. This chapter ends with a chapter summary.

3.1 Research Design

A research design provides framework to guide data collection and analysis, so that the hypotheses can be tested, and thus answering the research questions (Creswell, 2014). Research studies can be classified into three different categories, which are exploratory, descriptive, and explanation studies. An exploratory study is initiated when there is not much is known about the subject, or no information is available from previous study (Neuman, 2011). A descriptive study is conducted by building on the previous findings about the subject. It probes the subject further, and creates new information about the characteristics of the subject. An explanatory study commonly builds on the findings

from exploratory and descriptive studies, and determines to explain the causal relationship between two or more variables (Creswell, 2014). The nature of the research questions in this study is inclined toward causal relationship, as such explanatory study is most suitable for the purpose. Therefore, this study adopts the explanatory study to examine the causal relationships between customer loyalty and its predictors (product quality, trust, communication, and cooperation), and the mediating effects of commitment on the respective relationships.

Explanatory study is quantitative in nature, and as well as preplanned and structured in design (Creswell, 2014). For this reason, the quantitative research is the most suitable approach among the three common social science research approaches (qualitative, quantitative, and mixed method) for this study. Differing from qualitative research that explores the opinions and experiences of participants, quantitative research emphasizes objective measurements, and statistical analysis of data gathered from structured statements, and planned surveys. Quantitative research is highly structured, in which variables are specified, and their relationships are hypothesized for proving or disproving by means of statistical data analysis. The statistical analysis derives a set of comprehensive findings that help to answers the research questions. Therefore, quantitative research is appropriately selected for this study.

Structured questionnaire or statement is one of the most common data collection tools used in quantitative research. It consists of a series of closed-end questions or statements that are carefully phased according to the research questions. Each question or statement

provides a list of possible answer choices, where the respondents are requested to select the most appropriate choice. Questionnaires can be self-administrated by the respondents through mail, website or email. For this reason, questionnaire is effective in engaging respondents that are geographically dispersed, and considered to be most economical approach in quantitative research. Moreover, respondents are found to be more truthful while responding to the self-administrated questionnaire due to the fact that their inputs are anonymous (Wouters, Maesschalck, Peeters & Roosen, 2014). Therefore, this study uses self-administrated questionnaire, which is designed with closed-end statements, to collect data from E&E manufacturing firms that are geographically dispersed in Malaysia.

With regards to research time horizon, there are two options available. The first option is longitudinal study, and the second is cross-sectional study. In the longitudinal study, the same variable is observed multiple times over a long period of time. It is useful to detect developments or changes in characteristic of the variable over time. In contrast, cross-sectional study analyzes a set of variables simultaneously at a specific point of time (Kresmodel, 2018; Sekaran & Bougie, 2013). Accordingly, it is useful for studying the causal relationships between variables, such as the causal effects of the predictors toward dependent variable, at a given point in time (Zikmund, Babin, Carr, and Griffin, 2013). This study engages in a cross-sectional study, where data is collected once and analyze to discover the relationships between customer loyalty, and its predictors (product quality, trust, communication, and cooperation), and the mediating effects of commitment on the respective relationships. Moreover, cross-sectional study is the appropriate choice over

longitudinal study considering the time and resources impositions in this study.

3.2 Sampling Design

According to Kothari (2004), sampling design is considered a definite plan for obtaining samples from a given population. It is referring to the method or procedure to select samples. In this study, the sampling design includes determining the unit of analysis, sampling frame, sampling technique, and sample size determination. The sampling design of this study is based on probability sampling method, where each sample has equal and random chance of being selected for study.

3.2.1 Unit of Analysis

According to Neuman (2011), a study should fit concept to the specific type of entity that it intends to investigate and analyze. In social science research, the unit of analysis can consist of entity, such as individual, group and organization. The concept of this study is based on the effects of predictors, namely product quality, trust, cooperation, and communication, toward customer loyalty, and mediating effects of commitment of Malaysian E&E manufacturing firms toward their suppliers. Therefore, the unit of analysis is identified as organization.

There is only one response allowed from each of the E&E manufacturing firms. The respondents representing the E&E manufacturing firms should be the General Manager, Factory Manager, Purchasing Manager, Sourcing Manager, Supply Chain Manager, Supplier Quality Manager, Quality Manager, Material Manager or any senior staffs who

have decision making roles in managing suppliers.

3.2.2 Sampling Frame

A sample frame has significant implication on the accuracy and completeness of the research findings (Fowler, 2013). It is the source of material from a sample is drawn. In the context of this study, the sample frame is Malaysian E&E manufacturing firms listed in the Federation of Malaysian Manufacturers Industry Directory (FMM, 2016), and Malaysia External Trade Development Corporation (MATRADE) directory for computer hardware, consumer and industrial E&E products, telecommunication, and E&E parts and components (MATRADE, 2016). These two directories have the most reliable source of data, and have been widely referred by researchers who conducted studies on the E&E manufacturing industry in Malaysia (Abdullah & Tari, 2012; Ahmad et al., 2015; Amlus, Abdullah & Ibrahim, 2015; Mohammed Yusr, Mohd Mokhtar & Othman, 2014). According to the recent compilations, there are a total of 782 E&E manufacturing firms identified in the two directories, namely the Federation of Malaysian Manufacturers Industry Directory (FMM, 2016), and Malaysia External Trade Development Corporation (MATRADE) directory for computer hardware, consumer and industrial E&E products, telecommunication, and E&E parts and components (MATRADE, 2016).

3.2.3 Sampling Technique

Systematic random sampling method is considered the best sampling technique to obtain representative samples, since the focus of this study is Malaysian E&E manufacturing industry itself rather than specific sub-sectors. According to MIDA (2014), the Malaysian

E&E industry is classified into four sub-sectors, namely Electronics-Components, Electronics-Consumer, Electronics-Industrial, and Electrical. Based on the systematic random sampling procedure, each E&E manufacturing firms across the four sub-sectors of the Malaysian E&E industries has a known and equal chance of being selected as a test subject in this study. Therefore, this study adopts the systematic random sampling method to draw representative samples from the sample frame. Table 3.1 shows the structure of the Malaysia E&E industry.

Table 3.1

Structure of the Malaysia E&E industry

Sectors	**Sub-sectors**	**Examples of products**
Electronics	Components	Semiconductors, passive components, printed circuit boards, metal stamped parts, and precision plastic parts.
Electronics	Consumers	Audio visual products such as television receivers, portable multimedia players (PMPs), speakers, cameras and electronic games.
Electronics	Industrial	Multimedia and information technology products such as computers and computer peripherals, telecommunications equipment, office equipment and boxes built products for industrial applications.
Electrical	Electrical	Distribution boards, control panels, switching apparatus, lightings, electrical transformers, cables and wires, primary cells and batteries, solar cells and modules, air conditioners and household appliances.

Source: MIDA (2014)

3.2.4 Sample Size Determination

Appropriate sample size is critically important to minimize errors relating to sampling. According to Wolf, Harrington, Clark, and Miller (2013), there is likelihood to commit Type I error, where the sample size is too small. Type I error is related to rejecting the null hypothesis when it is true. On the other extreme, too many resources and time can be wasted when the sample size is excessively large. Therefore, an appropriate sample size is important for the study. Several rules-of-thumb recommendations have been advanced to estimate the appropriate sample size, namely, sample size of 100 to 200 for most social science studies (Boomsma, 1985), five to ten samples per measurement items (Bentler & Chou, 1987), and ten samples per variable (Nunnally, 1978). However, these rule-of-thumb recommendations are not model-specific, and may lead to exaggerated or underestimated sample sizes.

Cohen (1988) provided a scientific approach to determine sample size for research studies. The approach is popularly known as G*Power, in which the minimum sample size requires for a study is determined by critical parameters relating to effect size, significant level, number of predictors, and desired statistical power. The effect size is referring to the magnitude of difference between two groups of samples, and statistical power is the ability to detect a different when it exists. Using the user-friendly software for G*Power analysis (version 3.1.9.1 for Windows), a priori power analysis can be performed by inputting the desire level of effect size (f^2), confident level (α), statistical power ($1-\beta$), number of predictors, and the type of statistical testing to be performed, to determine the minimum sample size. Consistence with the standard recommendations by

Cohen (1988), the effect size (f^2=0.15), significant level (α=0.05), and statistical power (1-β=0.95) are used to compute the minimum sample size for this study with four predictors (product quality, trust, communication, and cooperation). The statistical results are displayed in Figure 3.1 and Figure 3.2. The minimum sample size is determined to be 129.

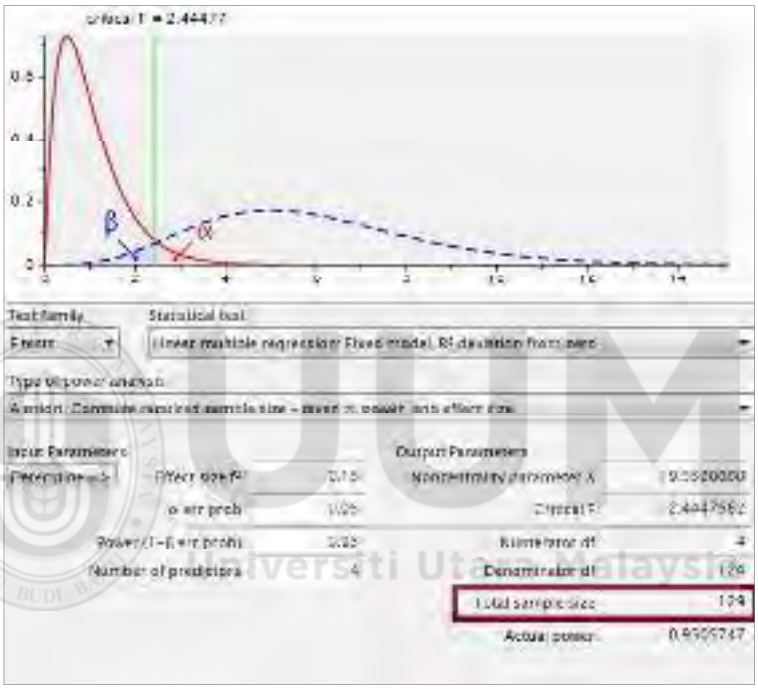

Figure 3.1

Priori power analysis result – computed sample size

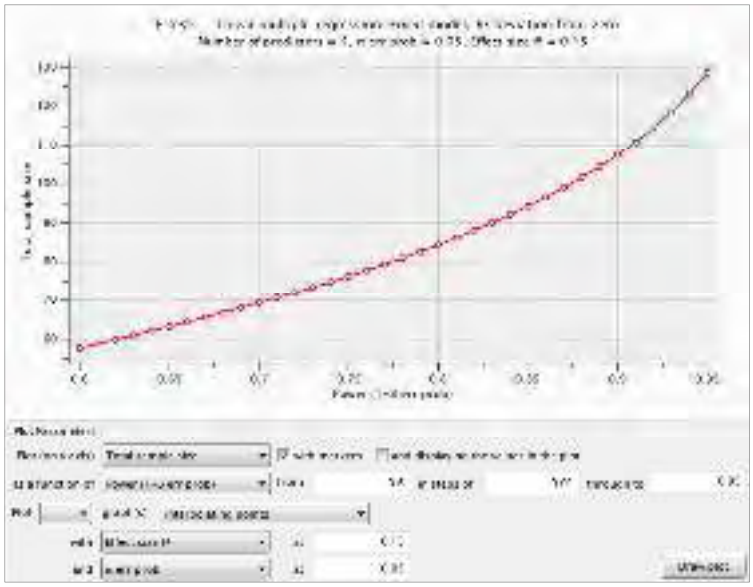

Figure 3.2

X-Y plot of priori power analysis

Krejcie and Morgan (1970) published a sampling table to simplify the process for determining sample size. The sampling table contains population sizes, and corresponding sample sizes. For a known population size, the sample size can be determined in the sampling table. In this study, the population size is referring to sample frame size, which is 782, and the sampling table indicates the sample size should be in between 260 and 265. This study has determined to use sample size of 265, which has smaller risk of committing Type I error (Wolf et al., 2013). Figure 3.3 shows the relevant portion of the Krejcie and Morgan (1970) sampling table that indicates the population sizes, and its corresponding sample sizes.

Population size	Sample Size
700	248
750	260
800	265
850	269

Figure 3.3

Determining the sample size for a known population size

Source: Adapted from Krejcie and Morgan (1970)

The sample size determined from the sampling table published by Krejcie and Morgan (1970) is apparently larger than the minimum amount of samples determined from the priori power analysis (129). According to Wolf et al. (2013), the statistical power to accept the true null hypothesis increases with larger sample size (Wolf et al., 2013). This means that the larger sample size has more likelihood to find the true statistical significant in the findings. Therefore, sample size of 265, which is determined from sampling table from Krejcie and Morgan (1970), is used in this study to select samples from the sample frame with 782 Malaysian E&E manufacturing firms. Besides, the sampling table from Krejcie and Morgan (1970) is most suitable for prevalence study, such as this study, in which the population size is known in the sample frame (Bujang, 2018). It has been popularly adopted in many research studies, which include applications in manufacturing industry (Al-Ali & Abu-Rumman, 2019; Arshad & Arshad, 2018; Shahbaz et al., 2019; Imran, Hamid & Aziz, 2018). Currently, there are more than 8,000 citations, which include research studies in the field of industry, in extant research

literatures.

Khor and Udin (2013) pointed out that it is common to find low response rate for mail surveys in the Malaysian industries. Accordingly, the poor response rate can lead to samples that are too few to draw any conclusions from. Thus, it is common for research studies to take more samples than the determined sample size (Afroz, Masud, Akhtar & Duasa, 2013; Hashim & Noor, 2012). In this study, similar precautionary action is taken to increase the sample size in accordance to the method proposed by Bartlett, Kotrlik, and Higgins (2001), where the total sample size to be drawn can be estimated by dividing the minimal sample size with the anticipated response rate. With the anticipated response rate of 38 percent, which was reported by previous survey questionnaire study in the same Malaysian E&E manufacturing industry (Ong, Ahmad & Baharin, 2013), and with minimal sample size of 265, the estimated sample size to be drawn is 698. Systematic random sampling method is used to draw 698 samples (E&E manufacturing firms) from the sample frame, and survey questionnaires are sent to all the selected 698 E&E manufacturing firms. This action is deemed necessary, in order to ensure at least 265 responded and useable survey questionnaires for the study.

As discussed in previous sub-chapter, systematic random sampling is adopted to randomly select samples from the sample frame in this study. For ease of generating random samples, a web-based software program known as Research Randomizer, which was developed by Kelley, Clark and Sitzia (2003), is applied to randomly generate 698 samples from the 782 E&E manufacturing firms identified in the sample frame. The

following simple steps are followed to generate the random samples.

a) Go to the Research Randomizer at website at www.randomizer.org

b) Move down to the Generate Numbers section

c) Key in 1 for instruction "How many set of numbers do you want to generate?

d) Key in 698 for instruction "How many numbers per set?"

e) Key in 782 for instruction "Number range"

f) Key in YES for instruction "Do you wish each number in a set to remain unique?"

g) Key in YES for instruction "Do you wish to sort the numbers that are generated?"

h) Select Randomize Now!

The identified Malaysian E&E manufacturing firms from Federation of Malaysian Manufacturers Industry Directory (FMM, 2016), and Malaysia External Trade Development Corporation (MATRADE) directory for computer hardware, consumer and industrial E&E products, telecommunication, and E&E parts and components (MATRADE, 2016) are compiled into a list, and sorted according to ascending order (A to Z). The Malaysian E&E manufacturing firms are then numbered from 1 to 782. The samples (Malaysian E&E manufacturing firms) are selected by matching their numbers against the numbers generated by the Research Randomizer. There are 698 samples randomly generated by the Research Randomizer software program.

3.3 Operationalization and Measurement of Variables

This study has six variables, namely customer loyalty, product quality, trust, cooperation,

communication, and commitment. The measurement instrument for each of the variables is adapted from previous relationship marketing studies, and modified to suit the research objectives of this study. In this study, the measurement instrument is developed by adopting the technique from Ulaga and Eggert (2006b), and Morgan and Hunt (1994), which requires respondents to assess the preferred supplier in making appropriate decision for the relationships. The preceding subsections dwell on the development of measurement instruments for customer loyalty, product quality, trust, cooperation, communication, and commitment.

3.3.1 Customer Loyalty

This study adopts the definition of customer loyalty from Pearson (as cited in Rai, 2912), who states "the mind-set of a customer, who hold a favorable attitude toward a company, commits to repurchase the company's products (or services), and recommends the products (or services) to others." This definition is based on composite concept of customer loyalty, which involves both the behavioral and attitudinal aspects.

Gil-Saura et al. (2009), and Askariazad and Babakhani (2015), demonstrated that behavioral aspect can be measured by repurchasing. Askariazad and Babakhani (2015), and Foster and Cadogan (2000) had measured attitudinal aspects with dimensions related to preference, positive word of mouth, and recommendation. Thus, attitudinal dimensions of preference, positive word of mouth, and recommendation, and behavioral dimensions of repurchasing can be selected, and used to operationalize customer loyalty in this study.

Appropriately, the measurement instrument, which has five measurement items, developed by Askariazad and Babakhani (2015), is selected and adapted to measure customer loyalty in this study. The adapted five measurement items are coded with initial CL in the measurement instrument. Table 3.2 shows the summary for the measurement instrument of customer loyalty, which includes the item code and measurement items.

Table 3.2

Measurement instrument for customer loyalty

Item code	Measurement items	Source
CL1	We consider the preferred supplier the first choice to buy parts that we need.	Adapted from Askariazad and Babakhani (2015)
CL2	We intend to repurchase from the preferred supplier in the next few years.	
CL3	We encourage colleagues, friends and/or customers to do business with the preferred supplier.	
CL4	We say positive things about the preferred supplier.	
CL5	We would definitely recommend the preferred supplier to someone who seeks our advice.	

3.3.2 Product Quality

In this study, the conceptual definition for product quality is adopted from Crosby (1979). Product quality is defined as "conformance to specification." It is a manufacturing-based approach to defining quality (Garvin, 1984), which takes into consideration for consistency in conformance, reliability and performance (Crosby, 1979; Garvin, 1984).

Eggert and Ulaga (2006a) had measured product quality by dimensions related to consistency in conformance, reliability and performance. Therefore, these dimensions can be used, and selected to operationalize product quality in this study.

Appropriately, the measurement instrument, which has six items, developed by Ulaga and Eggert (2006a) can be used, and adapted to measure product quality in this study. The adapted six measurement items are coded with initial PQ in the measurement instrument. Table 3.3 shows the summary for the measurement instrument of product quality, which includes the item codes, and measurement items.

Table 3.3

Measurement instrument for product quality

Item code	**Measurement items**	**Source**
PQ1	The preferred supplier provides us with better product quality.	Adapted from Ulaga and Eggert (2006a)
PQ2	The preferred supplier's product meets our quality standards better.	
PQ3	The preferred supplier's product is more reliable.	
PQ4	We have less product rejection from this preferred supplier.	
PQ5	The preferred supplier provides us with more consistent product quality over time.	
PQ6	We encounter less variation in product quality with the preferred supplier.	

3.3.3 Trust

Trust is conceptually defined as "a willingness to rely on an exchange partner in whom one has confidence" (Moorman et al., 1992). In this study, trust is viewed from the belief, and inter-organizational perspectives, which are characterized by reliability, credibility, benevolent, competency, and integrity (Moorman et al., 1992; Morgan & Hunt, 1994; Anderson & Narus, 1990). Chen et al. (2011) measured trust, which was viewed from belief and inter-organizational perspectives, with five dimensions related to reliability, credibility, benevolent, competency, and integrity. Therefore, these five dimensions can be used to operationalize trust in this study.

Accordingly, the measurement instrument, which has ten measurement items, developed by Chen et al. (2011) can be used, and adapted to measure trust in this study. The adapted ten measurement items are coded with initial TR in the measurement instrument. Table 3.4 shows the summary for the measurement instrument of trust, which includes the item codes and measurement items.

Table 3.4

Measurement instrument for trust

Item code	Measurement items	Source
TR1	When making important decisions, the preferred supplier is concerned with our welfare.	Adapted from Chen et al. (2011)
TR2	When we share our problem with the preferred supplier, we know that it will respond with understanding.	
TR3	Even when the preferred supplier gives us a rather unlikely explanation, we are confident that they are telling the truth.	
TR4	The preferred supplier usually keep promises that the make to us.	
TR5	The preferred supplier has often provided us with information that has later proven to be accurate.	
TR6	Whenever the preferred supplier gives us advises on our business operations, we know that they are sharing their best judgment.	
TR7	Though circumstances change, we believe the preferred supplier will be ready and willing to offer us assistance and support.	
TR8	We can count on the preferred supplier to be sincere.	
TR9	When it comes to things that are important to us, we can depend on the preferred supplier's support.	
TR10	In the future, we can count on the preferred supplier to consider how its decisions and actions will affect us.	

3.3.4 Cooperation

Cooperation is defined as "similar or complementary coordinated actions taken by firms in interdependent relationship to achieve mutual or singular outcomes with expected reciprocation over time" (Anderson & Narus, 1990). In this study, this definition takes into account the cooperation norms, which involve expectations that customer and supplier behave and act in a manner that they understand that they must work together to achieve mutual or individual goals jointly (Cannon & Perreault, 1999). Accordingly, Cannon and Perreault (1999) had measured cooperation with joint effort, and flexibility in response to changing situations and accommodating each other's needs.

The measurement instrument, which has six measurement items, developed by Cannon and Perreault (1999) can be appropriately used, and adapted to measure cooperation in this study. The adapted six measurement items are coded with initial CO in the measurement instrument of this study, Table 3.5 shows the summary for the measurement instrument of cooperation, which includes the item codes, and measurement items.

Table 3.5

Measurement instrument for cooperation

Item code	Measurement items	Source
CO1	No matter who is at fault, problems are joint responsibilities.	Adapted from Cannon and Perreault (1999)
CO2	Both parties (preferred supplier and us) are concerned about the other's profitability.	
CO3	One party (preferred supplier or us) will not take advantage of a strong bargaining position.	
CO4	Both sides (preferred supplier and us) are willing to make cooperative changes.	
CO5	We (preferred supplier and us) must work together to be successful.	
CO6	We (preferred supplier and us) do not mind owing each other favors.	

3.3.5 Communication

Communication is conceptually defined as "the formal as well as informal sharing of meaningful and timely information between firms" (Anderson & Narus, 1990). In this study, this definition takes into account the process of sharing timely and meaningful information, even though it is proprietary knowledge (Dimyati, 2015; Sohail, 2012). Krause and Ellram (1997) had demonstrated that communication can be measured by formal and informal exchange of information, timeliness, and keeping personnel informed.

Appropriately, the measurement instrument, which has six measurement items, developed by Krause and Ellram (1997) can be used, and adapted to measure cooperation in this study. The adapted six measurement items are coded with initial CN in the measurement instrument. Table 3.6 shows the summary for the measurement instrument of communication, which includes item codes, and measurement items.

Table 3.6

Measurement instrument for communication

Item code	**Measurement items**	**Source**
CN1	In this relationship, it is expected that any information that might help us will be provided to us by the preferred supplier.	Adapted from Krause and Ellram (1997)
CN2	Exchange of information in this relationship with the preferred takes place informally, and not only according to the specified agreement.	
CN3	It is expected the preferred supplier will provide proprietary information if it can help us.	
CN4	It is expected that the preferred supplier keep us informed about major events or changes that affect us.	
CN5	The communication effort between the preferred supplier and our firm involves many inter-firm personnel.	
CN6	Exchange of information in this relationship with the preferred supplier takes place in a timely manner.	

3.3.6 Commitment

Commitment is conceptually defined as "an enduring desire to maintain a valued relationship" (Moorman et al., 1992). This definition takes into account that customer and supplier want the relationship to sustain, and take necessary actions for the relationship to remain existence. Ulaga and Eggert (2006b) demonstrated that commitment can be operationalized by behavioral intentions to maintain and sustain the relationship.

Appropriately, the measurement instrument, which has six measurement items, developed by Ulaga and Eggert (2006b) can be used, and adapted to measure commitment in this study. The adapted six measurement items are coded with initial CM in the measurement instrument. Table 3.7 shows the summary for the measurement instrument of communication, which includes item codes, and measurement items.

Table 3.7

Measurement instrument for commitment

Item code	Measurement items	Source
CM1	The relationship with the preferred supplier is something to which we are very committed.	Adapted from Ulaga and Eggert (2006b)
CM2	The relationship with the preferred supplier is very important to our business.	
CM3	The relationship with the preferred supplier is something our firm intends to maintain for long time.	
CM4	The relationship with the preferred supplier is very much like being our firm.	
CM5	The relationship with the preferred supplier is something our business really cares about.	
CM6	The relationship with the preferred supplier deserves our business' maximum effort to maintain.	

3.4 Questionnaire Design

In this study, the questionnaires are organized into two sections, which are Section A, and Section B. In the Section A, there are nine closed-end statements, where five of them are related to the profile of the Malaysian E&E manufacturing firms, and the other four are associated with the demographic information of respondents. Each statement includes a list of answer choices, where respondents are requested to select by ticking or highlighting one answer choice that is most relevant and accurate with reference to the background of their Malaysian E&E manufacturing firms, and their demographic

profiles.

Section B contains 39 closed-end statements, of which five statements are related to customer loyalty, ten statements are related to trust, six statements each are related to product quality, cooperation, communication and commitment respectively. Seven-point Likert scale is adopted for all the 39 closed-end statements. The seven-point Likert scale measures how strongly the respondents agree or disagree with the statements. The scale ranges from 1 representing "Strongly Disagree" to 7 representing "Strongly Agree". Respondents are requested to select by ticking or highlighting one option that they deem most relevant and accurate with reference to the supplier management practices in their E&E manufacturing firms.

The seven-point Likert scale is specifically selected, and used in Section B, because it is more reliable and has taken the respondent fatigue into consideration (Hess, Hensher & Daly, 2012; Preston & Colman, 2000). Ramsay (1973) and Nunnally (1978) highlighted that seven-point Likert scale has maximum reliability. Preston and Colman (2000) substantiated the findings by determining that the seven-point scale has maximum reliability, and as the options of the Likert scale increase greater than ten-point, the reliability can decrease significantly. Furthermore, Hess et al., (2012) demonstrated that too many options can lead to respondent fatigue and confusion. Therefore, this study adopts the seven-point Likert scale, which is deemed optimal considering the respondent fatigue and sophistication of the questionnaires, and to maintaining high level of reliability. Besides, seven-point Likert scale is commonly adopted in similar relationship

marketing studies (Cater & Cater, 2010; Chen et al., 2011; Kim et al., 2013; Ulaga & Eggert, 2006a; Ulaga & Eggert, 2006b; Wu et al., 2015).

3.5 Pre-test

It is necessary to pre-test the questionnaires before the measurement instrument can be used to collect data from the respondents. Pretesting provides opportunity to determine errors that can lead to confusion and misinterpretation of the questionnaires. Such errors should be highlighted, and the affected questionnaire must be corrected to ensure that the questionnaire works as intended, and is understood by the respondents (Sekaran & Bougie, 2013). Further, Zikmund et al. (2011) pointed out that much of the accuracy and interpretability of the survey results hinge on the pre-testing activities that ensure adequacy of the questionnaires. Thus, this study adopts pre-testing of questionnaires in the measurement instrument.

Most researchers have agreed to use experts to pre-test the measurement instrument prior to the data collection (Sekaran & Bougie, 2013). The rationale is that the experts have the knowledge and experiences to identify the adequacy of the measurement instrument, and spot errors that may exist in the measurement instrument. In this study, the pre-testing is conducted by a group of experts consisting of four managers and two academicians. The managers have been working in Malaysian E&E manufacturing industry for more 10 years, while the two academicians have involved in the field of relationship marketing management for more than 10 years.

The pre-testing begins with a briefing on the purpose of study, research design, definitions of variables, and measurement instruments. The experts are requested to critically evaluate the adequacy of the measurement instrument, particularly the face validity and content validity. Face validity is referring the degree to which the measurement scale seems to measure what it supposes to measure, while content validity is referring the measurement scale whether it has included adequate or representative set of measurement items that describe the concept (Sekaran & Bougie, 2013; Kumar et al., 2013). Additionally, the time duration for them to complete the survey is observed and recorded accordingly.

In this study, the experts begin the pre-test by checking for appropriateness of wordings, spellings, grammars, and sentences. No error is found in the measurement instrument. They move on to check the clarity of the measurement items. There are no significant differences of opinions among six experts, who concluded that the measurement items are appropriate, clear, and easy to understand. According to their inputs, the measurement instrument is apparently measuring the six constructs, namely customer loyalty, product quality, trust, cooperation, communication, and commitment, of this study. Additionally, they agree that all the measurement items are adequate and representing the respective constructs, namely customer loyalty, product quality, trust, cooperation, and communication, and commitment.

The six experts opine that all the six measurement scales are inclined to reflective measurement, as described by Edwards and Bagozzi (2000). According to the recorded

time durations, the survey questionnaires are completed between 10 to 15 minutes. The time duration information is useful, and can serve as helpful reference to guide respondents in the data collection stage. It also serves two other purposes, namely, to avoid respondents from speeding through the survey, which can cause deterioration to the accuracy of the responses (Mejias & Beigi, 2015), and appeal to the respondents that the survey takes a short duration of their time, which is 10 to 15 minutes. The reference duration is stated in the cover letters, which are sent along with the survey questionnaires, to the respondents at the data collection stage.

3.6 Pilot Study

A pilot study is conducted to determine the reliability of the measurement instrument in this study. Reliability is referring to the internal consistency of the measurement instrument to produce the same results if it is used again in similar circumstances. According to Hair, Ringle, and Sarstedt (2013), the internal reliability is the most common measure of consistency for measurement instrument. The internal reliability can be expressed by the Cronbach's Alpha indicator, where the value equal or greater than 0.70 indicates the measurement instrument is reliable at the development stage for the measurement instrument, while the value lesser than 0.70 indicates the measurement instrument is unreliable, and has low internal reliability (Nunnally, 1978). Thus, this study adopts pilot study to determine the internal reliability of measurement instrument.

Hertzog (2008) commented that sample size of 20 to 30 is sufficient to determine internal reliability in measurement instrument, while Malhotra and Peterson (2006) determined

sample size ranging from 15 to 30 should be appropriate and commonly used in research studies. Thus, this study decides to use 30 samples to determine the internal reliability of the measurement instrument. Thirty Malaysian E&E manufacturing firms, which are located in Penang and Kedah, Malaysia, are invited, and have agreed to participate in the pilot study. The respondents are general managers, factory managers, managers, and senior staffs, who have decision making capacity to manage suppliers. The survey questionnaires, instructions, and self-addressed envelopes, which are used to facilitate returning of completed survey questionnaires, are sent to the 30 Malaysian E&E manufacturing firms through mail. The instructions request them to complete the survey questionnaires based on the best perceptions of supplier management practices in their firms. Only one respondent from each of the 30 E&E manufacturing firms is allowed to participate in the pilot study.

The completed questionnaires are screened for completeness and appropriateness, upon returned from the 30 respondents. The questionnaire responses are then input into the statistical analysis software Statistical Package for Social Sciences (SPSS), version 24 (for Windows) for data analysis. The Cronbach's Alpha indicator is determined for the individual measurement scales, namely, product quality, trust, communication, cooperation, commitment, and customer loyalty. If the Cronbach's Alpha indicator exceeds 0.70, the measurement scale is deemed reliable. Otherwise, the measurement scale is investigated for the unreliable items. The affected measurement scale is then analyzed again for Cronbach's Alpha indicator, after the unreliable item is removed or resolved.

The Cronbach's Alpha indicators for the six measurement scales, namely customer loyalty, product quality, trust, cooperation, communication, and commitment, are shown in Table 3.8. The Cronbach's Alpha indicators range from 0.801 to 0.848, which indicate that all six measurement scales have sufficient internal reliability. No measurement item is deleted from the pilot study, since each of the six measurement scales have demonstrated Cronbach's Alpha indicator greater than 0.70. In additional, all measurement items are correlated positively within the individual measurement scale. Details of the analysis for Cronbach's Alpha indicators are available in Appendix C1 for customer loyalty, Appendix C2 for product quality, Appendix C3 for trust, Appendix C4 for cooperation, Appendix C5 for communication, and Appendix C6 for commitment. All six measurement scales have demonstrated Cronbach's Alpha indicators greater than the threshold value of 0.70. Hence, the six measurement scales can be regarded as reliable for this study.

Table 3.8

Reliability of measurement scales

Variable	Total measurement items	Number of measurement item deleted	Cronbach's Alpha indicator
Customer loyalty	5	None	0.812
Product Quality	6	None	0.801
Trust	10	None	0.848
Cooperation	6	None	0.820
Communication	6	None	0.842
Commitment	6	None	0.816

3.7 Data Collection Strategy

The survey questionnaires are distributed, along with the official letters from Universiti Utara Malaysia, to the respondents. The official letter, which is attached in Appendix A, explains to respondents about the purposes, expectations, significance of study, assurance of data confidentiality, and the significant of their contributions. The survey questionnaire is appended in Appendix B. Self-addressed envelopes, which affix with stamps, are also enclosed to facilitate returning of the completed survey questionnaires. In addition, the author's email address is included in the survey questionnaires with the intention to provide another means for respondents to return the completed survey questionnaires. The Malaysian E&E manufacturing firms are contacted through phone calls two weeks later to ensure the packages, which contain the official letter, survey questionnaire, and self-addressed envelopes, are received, and forwarded to the relevant personnel, namely general managers, factory managers, managers, and senior staffs, who have decision making capacity to manage suppliers.

Brtnikova et al. (2018), and Babbie (2011) suggested that two follow ups, after the initial sending, to increase the response rate. The response rate is expected high from the initial sending, but decreases gradually from the first follow up. It is noted that the longer the delay, the less likely the respondents complete and return the completed survey questionnaire (Ary, Jacobs, Sorensen & Walker, 2013). As such, the two follow-ups are properly timed to remind and urge the respondents to conduct the survey, and return the completed survey questionnaire. In this study, the two follow up reminders are conducted through phone calls and electronics mails reminding the respondents to complete the

survey questionnaires. The interval between the follow up reminders is one month. The first follow-up reminder is initiated a month after the initial distribution, while the second follow-up reminder is conducted a month after the first follow-up.

3.8 Data Screening

Data screening is conducted on the returned survey questionnaires from respondents to check for accuracy and completeness. According to Desimone, Harms, and Desimone (2015), mail surveys are prone to data errors, such as missing values, multiple inputs and illegible entries. The presence of data errors can pose problems to data analysis. Hence, data screening is necessary to comb the raw data for any erroneous inputs. This is to ensure that appropriate level of data quality is used for data analysis. This study performs data screening for missing values, multiple inputs and illegible entries, and errors in normality, non-response bias, common method bias, and multicollinearity.

3.8.1 Missing Values, Multiple Inputs and Illegible Entries

One of the reasons that attributes to the data error, especially missing values, multiple inputs and illegible entries, is related to the nature of the mail survey, where the survey questionnaires are self-administrated by the respondents, and no immediate feedback is available when an error is committed in the survey questionnaires. Missing value is the most common data error detected during data screening in research studies (Malo et al., 2006). When missing values, multiple inputs and illegible entries are detected by the data screening process, data cleaning is initiated to treat them. Acuna and Rodriguez (2004) recommended that data set with error values, such as missing values, multiple inputs and

illegible entries, exceeding 15 percent is considered abnormal, and necessitate drastic actions to resolve it. Data screening and data cleaning processes are performed on the data sets from returned survey questionnaires in this study. Following the recommendation from Acuna and Rodriguez (2004) for data cleaning, affected survey questionnaires with more than 15 percent of missing values, multiple inputs and illegible entries are removed with listwise option, in which the entire data set are excluded from the study. Survey questionnaires with lesser than 15 percent of missing values, multiple inputs and illegible entries are deemed useable, and included for data analysis.

3.8.2 Normality

Normality is an important assumption for most statistical data analysis, which includes the statistical independent t-test. Deviation from the normality (data distribution), the data can create bias in data analysis, which subsequently leads to inaccurate finding. According to Tabachnick and Fidel (2007), normality of data distribution can be inspected through skewness and kurtosis. Skewness refers to the asymmetry of the data distribution, and kurtosis indicates the "peakedness" or flatness of the data distribution (Pallant, 2011). Figure 3.4 shows data distributions with various degrees of skewness and kurtosis.

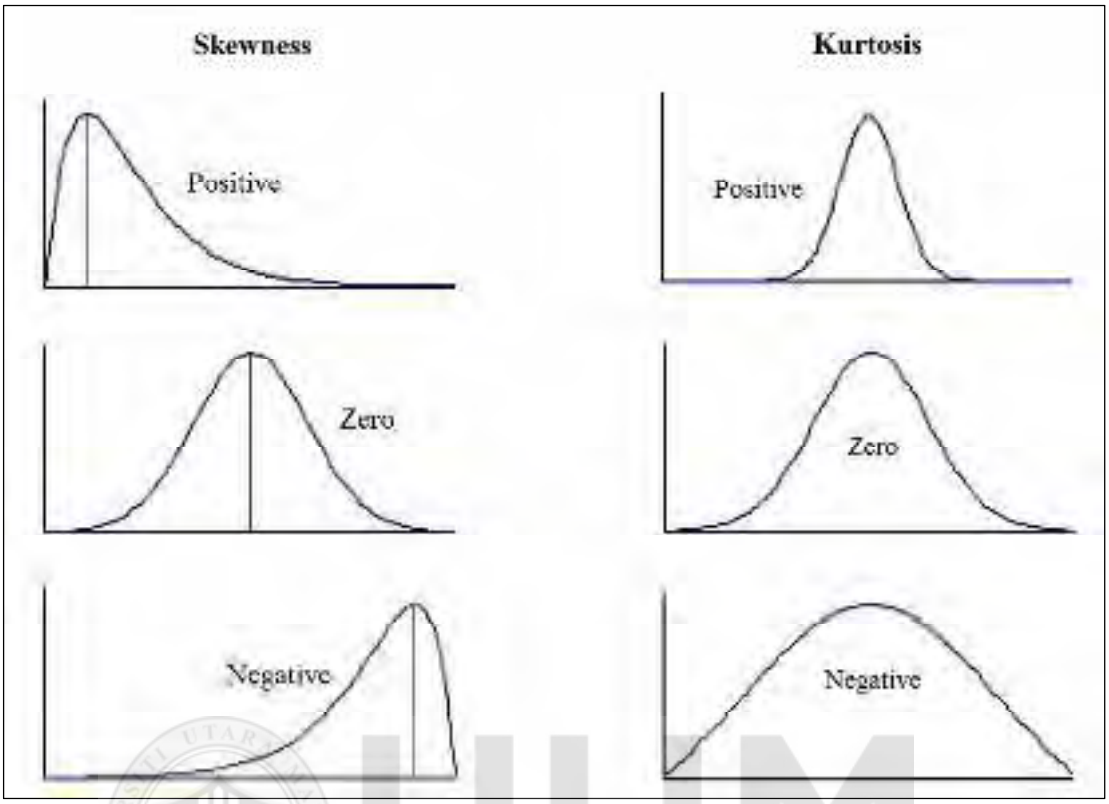

Figure 3.4

Distributions with skewness and kurtosis

Data distributions may appear as positively skewed, symmetrical, or negatively skewed. A distribution is known to have positive skewness, when the bulk of data is found on the right side of the distribution. When the data is distributed symmetrically, the distribution is known to have zero skewness. A negatively skewed distribution has majority of the data distributed at left side. Similarly, distributions may appear to have positive kurtosis, zero kurtosis, or negative kurtosis. Positive kurtosis indicates the distribution is overly peaked, while negative kurtosis indicates the distribution is relatively flat. Normal distribution has zero kurtosis value.

Hair et al. (2007) determined that the normality of data distribution can be assessed by using z-value, which is computed by dividing the skewness and kurtosis statistics with their standard errors respectively. If the z-values for skewness and kurtosis are within the threshold limits ± 2.58, the data distribution has demonstrated normality, and thus, it is deemed distributed normally. A distribution with z-values for skewness and kurtosis greater than threshold limits ± 2.58, it has violated normality, and thus, it is deemed not distributed normally. This study adopts the z-values for skewness and kurtosis requirements from Hair et al. (2007) to determine the normality of distributions for six variables, namely customer loyalty, product quality, trust, cooperation, communication, and commitment.

3.8.3 Non-response Bias

Non-response bias occurs when there are differences in survey responses between two groups of respondents, namely non-respondents and respondents. Due to the non responses, Berg (2005) pointed out that certain type of respondents or characteristics in the research samples can be under-represented in the study. Armstrong and Overton (1977) determined that late respondents are likely to provide responses similar to non-respondents. Following the recommendation by Armstrong and Overton (1977), this study segregates the survey responses into two groups, namely early respondents, and late respondents. Early respondent refers to survey questionnaires receive within one month after the initial distribution, while late respondent contains survey questionnaires return after the first follow-up.

The existence of non-response bias can be analyzed by comparing the statistical means of variables between the two groups of respondents, namely, early respondents and late respondents. The independent t-test analysis can be adopted to test the significant difference between the two groups of respondents (Armstrong & Overton, 1977). If the statistical analysis finding indicates that the difference is not significant, it can be concluded that there is no significant non-response bias between the two groups of respondents. Thus, the research sample is representative, and does not affect by non-response bias. On the other hand, if the statistical finding indicates significant difference, it can be concluded that non-response bias exists between the two groups of respondents. Hence, the research sample is affected by non-response bias. This study adopts the statistical analysis method recommended by Armstrong and Overton (1977) to compare the statistical means of variables, namely product quality, trust, cooperation, communication, commitment and customer loyalty, using statistical t-testing analysis to test the non-response bias between early respondents and late respondents.

3.8.4 Common Method Bias

Most researchers agreed that common method bias is attributed by the measurement method, such as measurement instrument, rather than the measurement construct (Podsakoff, Mackenzie, Lee & Podsakoff, 2003). Common method bias can be a source of measurement error that can threaten the validity of the research findings. Nunnally (1978) and Podsakoff et al. (2003) reported that random or systematic measurement errors in research findings can be caused by common method bias. Although both measurement errors are concern to researchers, Bagozzi and Yi (1991) noted that the

systematic measurement error is particularly more serious, as it can provide an alternative and wrong research finding about the relationship between variables, and thus leading to potentially misleading conclusion.

Harman's single-factor score test is one of the widely adopted methods to test the present of common method bias in social science researches (Eichhorn, 2014). In this analysis method, all factor items are loaded into one common factor item in the exploratory factor analysis, and common method bias is assumed to exist if the un-rotated factor solution nets a single factor item, or if a single factor item accounts for the majority of the variance among the variables (Bido, Mantovani, & Cohen, 2018; Podsakoff & Organ, 1986). According to Eichhorn (2014), the commonly accepted threshold is 50 percent, where common method bias may be present when the single factor item loading exceeds the threshold limit. Accordingly, if the single factor item loading is less than the threshold limit, it can be assumed that common method bias is not significant in the research data. This study adopts the Harman's single-factor score to analyzes common method bias by loading all the factor items from all the six variables, namely product quality, trust, cooperation, communication, commitment, and customer loyalty, into one common factor item in the exploratory factor analysis, and determine the un-rotated factor solution whether the single factor item accounts for less than the threshold of 50 percent (Eichhorn, 2014).

3.8.5 Multicollinearity

Multicollinearity exists whenever a predictor is highly correlated with one or more other

predictors in the multiple regressions model. Multicollinearity is an error in multiple regressions analysis, as it undermines the statistical significant of the predictor. The standard error of the coefficients increases, when the correlation among predictors happens in the multiple regressions model. The increased standard error can cause the predictor to be statistically insignificant, when it should be significant (Kalnins, 2018). Thus, failing to address this concern, statistical error can occur that leads to misleading analysis findings in the study.

It is important to test the presence of multicollinearity before proceeding to PLS-SEM analysis. According to Hair el. al (2013), it can be detected by determining the VIF coefficient. VIF coefficient greater than five indicates multicollinearity is significantly present in the structural model. Alternatively, the presence of multicollinearity in the structural model is considered not significant, if the VIF coefficient is less than five. This study adopts the VIF coefficient recommended by Hair et al (2013) to test present of multicollinearity.

With reference to the research framework of this study, two testing are necessary to determine the presence of multicollinearity in the multiple regressions model. The first testing involves five variables, namely, product quality, trust, cooperation, communication, and commitment, and the exogenous variable of customer loyalty. The second testing involves four variables, specifically product quality, trust, cooperation and communication, and the exogenous variable of commitment. In both testing, multicollinearity can be considered not significantly presence, only when all the related

variables obtain VIF coefficients lesser than five (Hair et al, 2013).

3.9 Data Analysis Methodology

This study is aided by the statistical analysis software SPSS (version 24 for Windows), and SmartPLS 3.0 (Ringle, et al., 2015) for data analysis. The statistical analysis software SPSS is utilized to analyze descriptive statistics of data, which is collected from the questionnaire surveys. The statistical analysis software SmartPLS 3.0 (Ringle, et al., 2015) is used to perform the Partial Least Squares – Structural Equation Modeling (PLS-SEM) analysis, where it determines the significant of nine direct relationships, path coefficients and predictive accuracy, and mediation effect analysis to establish the significant of mediation effects of commitment on the four indirect relationships.

3.9.1 Descriptive Statistics

Descriptive statistics are one of the statistical analyses which help to simplify and describe large amount of data into the form that is easy to understand and interpret. According to McHugh and Hudson-Barr (2003), mean, maximum, minimum, standard deviation, and frequency of occurrences are among the commonly used descriptive statistics in research studies to describe quantitatively the characteristics of data. In this study, descriptive statistics of frequency distribution is adopted to describe data for demographic profile of organizations. Similarly, it is used to describe data for demographic profile of respondents. Descriptive statistics of mean, maximum, minimum, and standard deviation are adopted to analyze data for all the six variables, namely customer loyalty, product quality, trust, cooperation, communication, and commitment.

3.9.2 Partial Least Squares - Structural Equation Modeling

Structural Equation Modeling (SEM) is a multivariate data analysis technique that is popularly used to analyze causal relationships in social and behavior science studies. It has the capability to analyze multiple relationships simultaneously in a complex model. Presently, there are two popular approaches in SEM. The first approach is covariance-based SEM (CB-SEM), which has been widely applied in social and behavioral science studies. The CB-SEM analysis is commonly supported by statistical software, such as the Analysis of a Moment Structures (AMOS), and Linear Structural Relations (LISREL). The second approach is the PLS-SEM, which the analysis focuses on maximizing the explained variance in the latent dependent variable. SmartPLS is the most common statistical software used in the PLS-SEM analysis. Although the PLS-SEM is less popular than CB-SEM, it is increasingly adopted in business and marketing studies in recent years (Hair et al., 2014).

PLS-SEM is adopted as the main data analysis technique in this study. This decision is made in accordance to the justifications relating to this study and the capabilities of PLS-SEM. The first justification is associated with small sample size. PLS-SEM is less stringent on sample size. It can utilize smaller sample size even in highly complex models. With small sample size, the PLS-SEM is still capable to achieve higher level of statistical power, and demonstrate much better convergent characteristic than CB-SEM (Astrachan, Patel & Wanzenried, 2014). Due to its capability to explain model with lesser constraint on sample size, PLS-SEM is preferred for data analysis in this study. The second justification is related to the normality of data distribution. PLS-SEM analysis

does not necessary require data to be normally distributed. It has the capability to transform the non-normally distributed data set into normal distribution by using bootstrapping procedure (Streukens & Leroi-Werelds, 2016). In contrast, CB-SEM analysis mandates data to be normally distributed. Non-normally distributed data can cause the CB-SEM analysis to underestimate the standard errors, and inflating the goodness-of-fit measures (Hair et al., 2013). Due to the nature of data collected from organizations, which is also the unit of analysis in this study, Peng and Lai (2012) pointed out that such data is often non-normally distributed. Therefore, PLS-SEM is the most suitable technique for data analysis in this study.

PLS-SEM composes of two models, which are the measurement model, and the structural model. The measurement model represents the relationships between the observed items and the latent variables. The structural model represents the relationships between the latent variables. Thus, the PLS-SEM analysis consists of two steps, where the first step involves estimating the measurement model, and the second step involves assessing the structural model. The second step should be initiated only after the first step has established the measurement model is valid, and reliable.

3.9.2.1 Measurement Model

Measurement model consists of relationships between observable items and their respective latent variables. According to Hair et al. (2013), there are two types of measurement models. The first type of measurement model is known as reflective construct, in which the observable items are manifestations of the latent variables. The

second type of measurement model is formative construct, where the observable items determine the latent variables. In this study, all the six constructs, namely product quality, trust, cooperation, communication, cooperation, commitment, and customer loyalty, are identified as reflective constructs.

The PLS-SEM has pre-requisite for estimation of measurement models. The estimations are necessary and intended to ensure that the latent variables, which form the basis of assessing relationships in the structural model, are represented and measured accurately. Hair, Sarstedt, Hopkins, and Kuppelwieser (2014) recommended that reflective measurements should be evaluated with four tests, namely indicator reliability, internal reliability, convergent validity, and discriminant validity. Accordingly, this study adopts the four tests recommended by Hair et al. (2014) to evaluate the reflective measurements for product quality, trust, cooperation, communication, cooperation, commitment, and customer loyalty.

According to Edwards and Bagozzi (2000), in a reflective construct, the observable items can be viewed as the manifestation of the latent variable. Figure 3.5 shows the diagram depicting the reflective construct, where the arrows originate from latent variable, and point to the observable items. Diamantopoulos and Winklhofer (2001) pointed out that observable items in a reflective construct are interchangeable, correlated among themselves, and capable of being removed without affecting the meaning of the reflective construct significantly. Accordingly, observable item that does not reflect well on the latent variable can be identified, and omitted to suit the overall theory or concept of the

construct (Tenenhaus, Vinzi, Chatelin & Lauro, 2005). Hence, this study adopts the same approach in evaluating the reflective constructs for product quality, trust, cooperation, communication, cooperation, commitment, and customer loyalty.

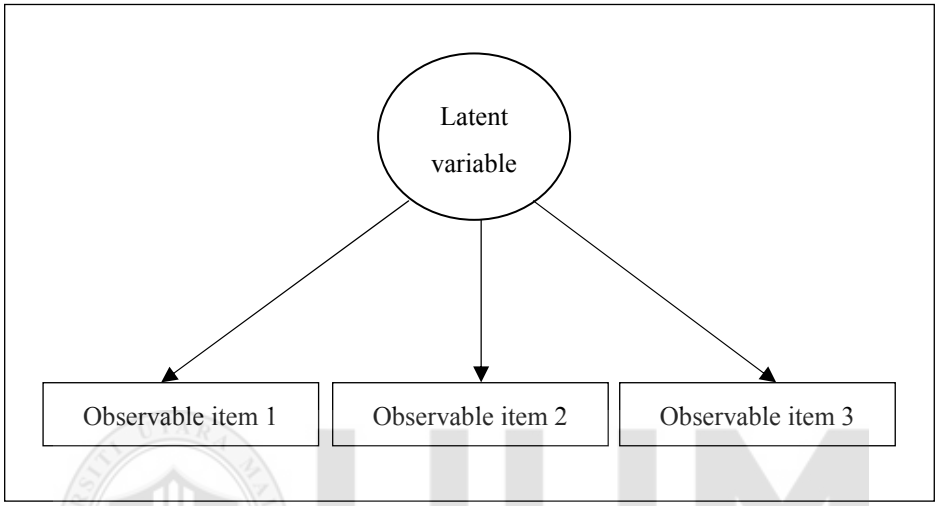

Figure 3.5

Reflective construct

The reliability of reflective construct can be evaluated with the indicator reliability, which is a measure of how well the observable items reflect on the latent variable. Fornell and Larcker (1981) pointed out that the indicator reliability can be determined from outer loading of the observable item. The square value of outer loading equals to the variance contributed or shared by the observable item to the latent variable. Accordingly, Falk and Miller (1992) recommended that outer loading should be greater than 0.70 to be appropriate. Observable item with outer loading less than 0.50 is considered to have unacceptable indicator reliability. It should be removed from the PLS-SEM analysis. Hair et al, (2014) argued that observable item with outer loading in-between 0.50 to 0.70

should be investigated to determine whether they can be deleted or retained according to the Average Variance Extracted (AVE), and composite reliability. The affected observable item should be considered to have unacceptable indicator reliability, if its removal can enhance the AVE and composite reliability above the threshold limits of 0.50, and 0.70 respectively. It should be removed from the PLS-SEM analysis. Alternatively, the observable item is considered to have acceptable indicator reliability, if its AVE and composite reliability have already been achieved the threshold limits of 0.50, and 0.70 respectively. It should not be removed from the PLS-SEM analysis. This study adopts the requirements of indicator reliability recommended by Fornell and Miller (1992), and Hair et al. (2014).

Another reliability measure is the internal reliability of the reflective construct, which can be evaluated by composite reliability. Nunnally (1978) determined that composite reliability with value greater than 0.70 is considered as reliable measure. Composite reliability rather than Cronbach's Alpha is preferred in the PLS-SEM analysis, because composite reliability can accommodate different indicators loadings, and capable to avoid underestimating the internal consistency reliability (Hair at al., 2014). This study adopts the requirements of composite reliability recommended by Nunnally (1978).

Convergent validity is achieved when multiple measurement (observable) items converge or are associated with one another other (Cronbach & Meehl, 1955). It means that multiple measurement items of the same construct hang together or operate in similar way. According to Hair et al., (2013), convergent validity can be tested with AVE, which

is computed by averaging the variances of the observable items of the affected construct. The threshold value for AVE should be 0.50 (Hair et al., 2013). Accordingly, a construct is deemed to have achieved convergent validity, when the AVE value is greater than 0.50. Therefore, this study adopts the AVE requirements for determining the convergent validity from Hair et al. (2013).

Discriminant validity occurs when multiple items converge on one construct, but are also negatively associated with opposing constructs (Cronbach & Meehl, 1955). Discriminant validity differentiates one construct from other constructs in the same measurement instrument. According to Fornell and Larcker (1981), discriminant validity can be assessed by comparing the square root of the AVE for a given construct with the bivariate correlations between that construct and all other constructs. If the value of the square root of AVE is greater than all the related bivariate correlation values, the given construct is considered to have acceptable discriminant validity. This study adopts the requirements for determining convergent validity from Fornell and Larcker (1981).

3.9.2.2 Structural Model

Once the measurement model is proven valid and reliable, the second step is initiated to assess the structural model. The structural model consists of multiple paths or relationships between latent variables. These relationships are evaluated simultaneously for significant, and the findings enable testing of hypotheses. In this study, the analysis consists of determination of path coefficients, significant of relationships, and predictive accuracy.

Path coefficient can be used to indicate the correlation between variables in the structural model. The path coefficient value ranges from -1 to 1, where 1 indicates the two variables are highly and positively correlated, and -1 indicates the two variables are highly and negatively correlated. Path coefficient value of zero indicates that there is no correlation between the two variables. For the relationship to be significant, the path coefficient must be proven significant with statistical t-test. In the PLS-SEM, the statistical t-test can be generated with bootstrapping procedure. According to Streukens and Leroi-Werelds (2016), PLS-SEM is a non-parametric analysis, and does not assume the distribution of the data. If the data is not distributed normal, the analysis is likely to inflate or deflate the t-statistic value, and thus, creating error in the analysis. To overcome this error, Henseler, Hubona, and Ray (2016) recommended applying bootstrapping procedure with 4,999 re-samplings, which are tractable with regard to computation time and allow for an unanimous determination of empirical bootstrap confidence intervals, to approximate normality for t-statistic values for significant testing of relationships in the structural model. Wong (2013) substantiated that the bootstrapping results can approximate the normality of data. This study adopted the recommendation by Henseler et al. (2016) to apply bootstrapping procedure with 4,999 re-samplings to generate the t-statistics.

A path coefficient is considered significant when the following two conditions are met. The first condition is related to the t-statistic, in which the value must be greater than 1.645 (significant level, 0.05) and 2.33 (significant level, 0.01) for one-tail testing, which are applicable to analysis of relationships in this study. The second condition is related to the significant level (p-value), in which the determined p-value must be lesser than the

predefined significant level. The pre-defined significant levels of 0.05 and 0.01 are commonly adopted in most social and behavior studies (Hair et. al, 2013). This study adopts the same requirements for t-statistics and p-values to test the significant of relationships.

R^2 can be used to determine the predictive accuracy of structural model. In statistical term, R^2 represents the amount of variance in the dependent variable that can be explained by all the independent variables linked to it. The value of R^2 can range from zero to one, where one indicates prefect predictive accuracy, and zero has no predictive accuracy. Cohen (1988) described that R^2 value of 0.26, 0.13 and 0.02 indicating substantial, moderate and weak level of predictive accuracy respectively. Additionally, Falk and Miller (1992) claimed that the R^2 value should be greater than 0.10 for the variance explained of a given endogenous variable to be significant and adequate. This study adopts the R^2 classification by Cohen (1988), and the R^2 requirement by Falk and Miller (1992) to assess the predictive accuracy of the structural model.

3.10 Mediation Analysis

A mediation effect occurs when the effect of a predictor is transmitted to a mediator, which in turn, transfers it to the dependent variable. As such, the mediation analysis involves two relationships, which are the relationship between predictor and mediator (a), and the relationship between mediator and dependent variable (b). Preacher and Hayes (2008) pointed out that both the relationships (a and b) must be significant for mediation to occur. Additionally, mediation effect may happen even though the direct relationship

between the predictor and dependent variable is not statistically significant (Preacher and Hayes, 2008).

Preacher and Hayes (2008) recommended a bootstrapping technique to analyze the effect of mediation. The bootstrapping technique is suitable for PLS-SEM application, which is a non-parametric method that does not impose the assumption of normality on the data normality distribution. The recommended bootstrapping technique involves repeatedly random re-samplings of data with replacements from the original sample data to generate empirical distribution for the mediation effect (a x b). Hayes (2009) pointed out that the bootstrapping testing relies on 95 percent confident interval, where the upper bound is 97.25 percent, and lower bound is 2.5 percent. Accordingly, if the determined confident interval does not include zero, the mediation effect is established, and is deemed significant. Conversely, if the determined confident interval include zero, the mediation effect is not established, and not significant. This study adopts the bootstrapping technique recommended by Preacher and Hayes (2008), and Hayes (2009) to determine the mediation effect of commitment on the relationships between the predictors (product quality, trust, cooperation, and communication) and the dependent variable of customer loyalty. As recommended by Henseler et al. (2016), 4,999 re-samplings are applied in the bootstrapping technique.

Nitzl, Roldan, and Cepeda-Carrion (2016) identified two different types of mediations. The first type is related to full mediation. It occurs when the mediation effect is significant, but the direct effect of the relationship between the predictor and dependent

variable is not significant. In this type, the effect of predictor is transmitted to the dependent variable via the mediator only. The second type is known as partial mediation, in which the mediation effect is significant, and as well as the direct effect of the relationship between predictor and dependent variable. In this type, the effect of predictor is partially transferred to the dependent variable via the mediator.

Mediation effect can be computed and determined based on the analysis of Variance Account For (VAF) index, which is calculated by dividing the indirect effect with total effect, which consists of both indirect effect and direct effect (Hair et al., 2017). According to Hair et al. (2017), VAF index with value less than threshold limit of 0.20 indicates that there is no mediation, VAF index with value in-between 0.20 to 0.80 implies partial mediation, and VAF index with value greater than 0.80 signifies full mediation. Thus, this study adopts recommendation from Nitzl et al. (2016), and Hair et al. (2017) to analyze the mediation effects of commitment in the relationships between, product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty.

3.11 Chapter Summary

This chapter begins with discussion on the research design, where the explanatory study design is selected to investigate the causal relationships between customer loyalty and its predictors (product quality, trust, cooperation, and communication) and the mediating effects of commitment on the affected relationships. A cross-sectional study is deemed most fitting for this study, where quantitative research approach is used to collect and

analyze data from the responses in survey questionnaires. The sample frame consists of Malaysian E&E manufacturing firms listed in the Federation of Malaysian Manufacturers Industry Directory (FMM, 2016), and Malaysia External Trade Development Corporation (MATRADE) directory for computer hardware, consumer and industrial E&E products, telecommunication, and E&E parts and components (MATRADE, 2016). Systematic random sampling is adopted to select Malaysian E&E manufacturing firms, representing the four sub-sectors of Malaysian E&E industry, listed in the two directories. Sample size is determined from the sampling table published by Krejcie and Morgan (1970). The unit of analysis is identified as organization, where only one respondent is allowed for each organization in the questionnaire survey.

The questionnaire is tested for adequate face validity and content validity at the pre-test stage, and for acceptable internal reliability at the pilot study. Questionnaires and cover letters are distributed to the respondents through mails. Two follow-up reminders are carried out to increase response rate. To ensure appropriate level of data quality for data analysis, data screening for missing values, multiple inputs and illegible entries, and error in normality, non-response bias, common method bias and multicollinearity are conducted on the data from questionnaire responses.

Descriptive analysis is conducted, after the data has been screened for missing values, multiple inputs and illegible entries, and errors in normality distribution, non-response bias, common method bias and multicollinearity. It follows by data analysis with PLS-SEM, which is adopted as the main data analysis technique. It is aided by the statistical

software SmartPLS 3.0 (Ringle et al., 2015). The PLS-SEM analysis consists of two steps approach. The first step involves estimating the measurement model. The reflective measurement models are evaluated for indictor reliability, composite reliability, convergent validity, and discriminant validity. The second step involves assessing the structural model, which involve determination of path coefficients, significant of relationships, and predictive accuracy. Mediation effects are determined with the bootstrapping technique recommended by Preacher and Hayes (2008), and Hayes (2009). Types of mediating effects are analyzed with methods recommended by Nitzl et al. (2016) and Hair et al. (2017).

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter dwells on data analysis, and describes the findings of this study. A series of statistical techniques are utilized to analyze data from the questionnaire surveys. The analysis starts with overview of the survey data, and follow-ups with preliminary data screening for missing values, multiple inputs and illegible entries, and determination of response rate of survey questionnaires. The data is further screened for errors in normality, non-response bias, common method bias, and multicollinearity. Upon satisfactorily confirming the data is free from such errors, descriptive analysis is conducted to determine descriptive statistics for the demographic profiles of organizations and respondents, and the variables of this study.

PLS-SEM analysis is then performed, which contains estimation of measurement model, and assessment of structural model. Estimation of measurement model involves determining the validity of the reflective constructs with indicator reliability, composite reliability, convergent validity and discriminant validity. The assessment of structural model consists of determining the path coefficients, significant of relationships, and predictive accuracy. The mediation analyses are then performed to determine of mediating effects of commitment on the relationships between predictors, namely product

quality, trust, communication and cooperation, and customer loyalty. The data analysis results are used to test the 13 hypotheses of this study. A summary of hypotheses testing is presented to simplify the findings of this study. This chapter ends with a chapter summary describing the findings that have been accomplished in this study.

4.1 Overview of Survey Data

As described in previous chapters, sources of data for this study come from two directories, which are the FMM Industry Directory (FMM, 2016), and MATRADE directory for computer hardware, consumer and industrial E&E products, telecommunication, and E&E parts and component (MATRADE, 2016). A total of 782 E&E manufacturing firms are identified, after carefully avoiding overlap counts, and obsolete information of Malaysian E&E manufacturing firms that appear in both directories. Due to low response rate for mail surveys in the Malaysian industries (Khor & Udin, 2013; Ong et al., 2013), and to meet the minimum sample size requirement of 265, a total of 698 survey questionnaires are sent to the Malaysian E&E manufacturing firms. There is only one response allowed from each of the 698 Malaysian E&E manufacturing firms.

4.1.1 Response Rate of Survey Questionnaires

Data collection is carried out for a duration period of three months. It begins on 1st September, 2017, and ends on 30th November, 2017. Survey questionnaires are sent to 698 respondents, and two follow-ups are performed after the initial sending. The first follow-up reminder is carried out one month after the initial sending, and the second

follow-up reminder is conducted one month after the first follow-up. The follow-up activities are intended to increase the response rate. Of the 698 survey questionnaires sent to the respondents, 276 of them returned towards the end of the data collection duration period.

Prior to determining the response rate, preliminary data screening process is carried out manually to identify data error, specifically missing values, multiple inputs and illegible entries, on the 698 returned survey questionnaires. Following the recommendation by Acuna and Rodriguez (2004), survey questionnaires with data errors exceeding 15 percent are removed according to listwise option, where the affected survey questionnaire is excluded, and not used for data analysis in this study. The data screening process has identified data errors on nine returned survey questionnaires, of which eight are affected with excessive missing values, and one has two missing pages. The remaining returned survey questionnaires of 267 are verified that they have no missing value, multiple inputs and illegible entries, and are valid and usable for this study.

Draugalis, Coons, and Plaza (2008) defined response rate as the quantities of usable survey questionnaires divides by the total quantities of survey questionnaires distributed. After discounting nine unusable survey questionnaires, there are a total of 267 survey questionnaires that are verified usable in this study. Total survey questionnaires that are distributed in this study are 698. Following the definition from Draugalis et al. (2008), the response rate is computed by dividing 267 usable survey questionnaires with total distributed survey questionnaire, which yields 38 percent response rate. Thus, the

response rate is 38 percent for this study. Table 4.1 shows the distributions of survey questionnaires and response rate.

Table 4.1

Distributions of survey questionnaires and response rates

Distributions	Frequency / Rate
Distributed survey questionnaires	698
Survey questionnaires that are not returned	422
Returned survey questionnaires	276
Returned survey questionnaires that are verified valid and usable	267
Returned survey questionnaires that are invalid and unusable	9
Valid response rate	38%

Langer (2003) explained that one of the key aspects of response rate is related to willingness of respondents to cooperate and complete the survey. Accordingly, 38 percent of respondents are willing to cooperate and complete the questionnaire survey for this study. This response rate is found similar to previous study conducted in the same Malaysian E&E manufacturing industry (Ong et al., 2013). It is deemed acceptable given the low response rate associated with mail surveys commonly found in the Malaysian industries (Khor & Udin, 2013). The response rate exceeds the minimum response rate of 20 percent recommended by Malhotra and Grover (1998). Moreover, the numbers of

returned questionnaires, which are verified complete and valid, is more than the minimum sample size of 265.

4.2 Data Screening

Apart from the preliminarily data screening for missing values, multiple inputs and illegible entries, testing for data distribution normality, non-response bias, common method bias, and multicollinearity are necessary to ensure the data is free from errors before initiating data analysis. In this study, testing for data distribution normality, non-response bias, common method bias, and multicollinearity are performed on the 267 sets of data collected from the questionnaire surveys to ensure the data has appropriate level of quality for data analysis

4.2.1 Test of Normality

Most of the statistical data analysis techniques, such as independent t-test for analysis of non-response bias, assume that data is distributed normally. Data set that is not normally distributed can cause bias in statistical data analysis, which subsequently leads to erroneous finding. Therefore, it is necessary to test the data distribution for normality prior to data analysis. Tabachnick and Fidel (2007) explained that data distribution normality can be inspected through skewness and kurtosis, where skewness refers to asymmetry of the data distribution, and kurtosis indicates “peakedness” or flatness of the data distribution. Following the explanation from Hair et al. (2007), skewness and kurtosis can be measured and assessed by the z-values, which are determined by dividing

the respective statistics with standard errors. Accordingly, if the z-values of skewness and kurtosis are within the threshold limit ± 2.58, the data distribution has demonstrated normality, and thus can be considered normally distributed. Alternatively, if the z-values for skewness and kurtosis are not within the threshold limit ± 2.58, the data distribution does not demonstrate normality, and therefore, is deemed not distributed normally. This study adopts the z-value criteria for skewness and kurtosis recommended by Hair et al. (2007) to assess the normality of data distributions for variables product quality, trust, cooperation, communication, and commitment, and customer loyalty.

Table 4.2 presents the z-values of skewness and kurtosis for the six variables. According to the z-values, all six variables are distributed with positive skewness. Product quality has the highest skewness z-value of 2.121 and communication has the lowest skewness z-value of 0.396. Data of four variables, specifically customer loyalty, product quality, cooperation, and commitment, are distributed with negative kurtosis, which indicate the distributions are relatively more flat than the normal distribution. Commitment has the highest negative kurtosis z-value of -1.642, and cooperation has the lowest negative kurtosis z-value 0f -0.283. Data distributions for trust and communication exhibit positive kurtosis, which indicates that the distributions are more "peakedness" than normal distribution. Communication has the highest positive kurtosis z-value of 0.808, and trust has the lowest positive kurtosis z-value of 0.626. With reference to the recommendation from Hair et al. (2007) for the requirements of skewness and kurtosis, all the six variables have z-values within the threshold limit of ±2.58, which indicate that data distributions of all the six variables are distributed normally. Detailed analysis results of distribution

normality are shown in Appendix D1, Appendix D2, Appendix D3, Appendix D4, Appendix D5, and Appendix D6 for customer loyalty, product quality, trust, cooperation, communication, and commitment respectively.

Table 4.2

Results for test of normality

Variable	Skewness			Kurtosis		
	Statistic	Standard error	z-value	Statistic	Standard error	z-value
Customer loyalty	0.112	0.149	0.751	-0.360	0.297	-1.212
Product quality	0.316	0.149	2.121	-0.450	0.297	-1.515
Trust	0.162	0.149	1.087	0.186	0.297	0.626
Cooperation	0.187	0.149	1.255	-0.840	0.297	-0.283
Communication	0.059	0.149	0.396	0.240	0.297	0.808
Commitment	0.243	0.149	1.631	-0.480	0.297	-1.642

Note: z-values are computed by dividing the skewness and kurtosis statistics with their respective standard errors (Hair et al., 2007)

4.2.2 Test of Non-response Bias

Following the recommendation from Armstrong and Overton (1977), the returned questionnaires are segregated into two groups, namely early respondents and late respondents, after they are verified valid, and usable. Early respondents are survey

questionnaires returned from duration period between initial distribution and the first follow-up, which is performed one month after the initial distribution. There are 105 survey questionnaire classified as early respondents. Late respondents contain survey questionnaires returned after the first follow-up. There are 162 late respondents. According to Armstrong and Overton (1977), the late respondents are likely to provide responses similar to non-respondents. As such, the 162 late respondents are treated as non-respondents in this study.

Berg (2005) argued that non-response bias may happen between early respondents and late respondents due to the differing demographic factors, such as tenure in firm, size of firm, age, and education level. Accordingly, non-response bias can adversely affect the validity of the study. As such, non-response bias should be determined, and its existence can be identified by comparing the statistical means of the early respondents, and late respondents (Armstrong & Overton, 1977). Non-response bias is deemed exist when there is significant difference between the two group means. Alternatively, it is considered non-existence, if the difference between the two group means is not significant. The non-existence of non-response bias implies that the means are valid, and can be generalized to the population, which is the Malaysian E&E manufacturing industry.

Independent t-test is adopted to test the significant differences of means between the two groups, namely early respondents and late respondents. The independent t-test consists of two statistical testing, which are Levene's equality for variances, and t-test for equality of

means. Table 4.3 presents the independent t-test results for the variables of customer loyalty, product quality, trust, cooperation, communication and commitment of this study.

Table 4.3

Results of non-response bias test

Variables	Means of respondents		Levene's test for equality of variances		t-test for equality of means			
	Early (n=105)	Late (n=162)	F	Sig.	t	DF	Significant (2-tails)	Means difference
Customer loyalty	6.213	6.181	0.214	0.644	0.649	265	0.517	0.312
Product quality	6.215	6.216	0.019	0.891	-0.003	265	0.998	-0.001
Trust	5.945	5.964	0.416	0.519	-0.393	265	0.695	-0.019
Cooperation	6.122	6.063	1.317	0.252	1.175	265	0.241	0.059
Communication	5.906	5.955	0.328	0.567	-1.234	265	0.218	-0.048
Commitment	6.154	6.168	1.291	0.257	-0.298	265	0.766	-0.014

The independent t-test assumes that the two groups have equal variances. This assumption should be tested by using Levene's equality for variances, prior to conclusion of the statistical t-test. According to Pallant (2011), if the Levene's test for equality of variances determines that the significant value is greater than 0.05, it indicates that there is no significant difference of variances between the two groups. Conversely, if the Levene's test for equality of variances than the significant value is lesser than 0.05, it indicates that there is significant difference of variances between the two groups. Based on the independent t-test results in Table 4.3, the Levene's test for equality of variances is determined that the significant value is greater than 0.05 for the two groups, namely early

respondents and late respondents, for all the six variables of customer loyalty, product quality, trust, cooperation, communication, and commitment. The results indicate that there are no significant differences in variances between early respondents and late respondents of all the six variables.

The independent t-test proceeds to test the equality of means between the two group means by using statistical t-test for equality of means. According to Pallant (2011), if the t-test for equality of means determines that the significant value is greater than 0.05, it indicates that there is no significant different between the two group means. Alternatively, if the t-test for equality of means determines that the significant value is lesser than 0.05, it indicates that the difference between the two group means is significant. Based on the independent t-test results in Table 4.3, the t-test for equality of means determines that the significant value is greater than 0.05, which indicates that the differences between the two groups means, namely for early respondents and late respondents, are not significant for all the six variables of customer loyalty, product quality, trust, cooperation, communication, and commitment. Hence, it can be concluded that there are no non-response biases between the early respondents and late respondents exist in all the six variables (customer loyalty, product quality, trust, cooperation, communication, and commitment) of this study. Detailed analysis results of non-response bias are shown in Appendix E1, Appendix E2, Appendix E3, Appendix E4, Appendix E5, and Appendix E6 for customer loyalty, product quality, trust, cooperation, communication, and commitment respectively.

4.2.3 Test of Common Method Bias

Common method bias occurs when errors in responses are caused by the measurement method, such as measurement instrument, rather than the measurement constructs. It can be assumed that common method bias is a systematic error, which can create alternative findings leading to wrong conclusion (Podsakoff & Organ, 1986). Common method bias can be tested by Harman's single-factor score, where all factor items are loaded onto one single factor item in the factor analysis. According to Eichhorn (2014), if the un-rotated factor solution yields a single factor item accounts for majority of variance among all the factor items exceeds 50 percent, it indicates that common method bias exists, and is considered significant in the study. Contrarily, if the un-rotated factor solution yields a single factor item that accounts for majority of variance among all the factor items is less than 50 percent, it indicates common method bias is not significant.

Accordingly, the Harman's single-factor score test is performed by loading all the 39 factor items, of which five factor items for customer loyalty, six factor items for product quality, ten factor items for trust, six factor items for cooperation, six factor items for communication, and six factor items for commitment, into a single factor item in the factor analysis. Principle Component Analysis (PCA) approach to factor analysis is preferred and adopted to obtain and empirical summary of the data set in this study. Result of the Harman single-factor score is shown in Table 4.4.

Table 4.4

Results of common method bias test

Factor item	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	10.661	27.335	27.335	10.661	27.335	27.335
2	2.296	5.887	33.222			
3	2.302	5.209	38.432			
4	1.501	3.849	42,280			
5	1.405	3.602	45.883			
6	1.304	3.344	49.226			
7	1.138	2.918	52.144			
8	1.086	2.784	54.929			
9	1.041	2.669	57.598			
10	1.053	2.653	60.252			
11	0.935	2.398	62.650			
12	0.887	2.275	64.925			
13	0.866	2.220	67.144			
14	0.837	2.147	69.292			
15	0.805	2.065	71.357			
16	0.757	1.940	73.297			
17	0.750	1.923	75.219			
18	0.650	1.667	76.886			
19	0.642	1.647	78.533			
20	0.612	1.570	80.103			
21	0.581	1.490	81.592			
22	0.571	1.465	83.058			
23	0.546	1.400	84.457			
24	0.519	1.331	85.789			
25	0.501	1.286	87.075			
26	0.484	1.240	88.314			
27	0.472	1.211	89.526			
28	0.453	1.161	90.686			
29	0.446	1.144	91.830			
30	0.404	1.037	92.867			
31	0.374	0.960	93.827			
32	0.358	0.918	94.744			
33	0.353	0.906	95.650			
34	0.336	0.861	96.511			
35	0.302	0.774	97.285			
36	0.290	0.744	98.029			
37	0.282	0.722	98.751			
38	0.263	0.675	99.426			
39	0.224	0.574	100.000			

Based on the Harman's single-factor score test results in Table 4.4, the un-rotated solution for all the 39 factor items into single factor item yields 27.335 percent of variance, which is less than the threshold of 50 percent recommended by Eichhorn (2014). The Harman's single-factor score test result indicates that the common method bias is not significant, and thus, unlikely to yield measurement error in this study. Detailed analysis results of the Harman's single-score test are shown in Appendix F.

4.2.4 Test of Multicollinearity

Multicollinearity is one of the major concerns in multiple regression analysis. Unless this concern is addressed prior to the PLS-SEM analysis, statistical error can occur that leads to misleading analysis findings. According to Kock and Lynch (2012), even though the discriminant validity has been established during the estimation of PLS-SEM measurement model, multicollinearity may still exist in the structural model. Therefore, it is important to test the presence of multicollinearity before proceeding to assess the structural model. Hair el. al (2013) pointed out that the presence of multicollinearity can be determined by VIF coefficient, where the VIF coefficient greater than five indicates multicollinearity is significantly present in the structural model. Alternatively, the presence of multicollinearity in the structural model is considered not significant, if the VIF coefficient is less than five. This study adopts the VIF coefficient recommended by Hair et al (2013) to test present of multicollinearity.

With reference to the research framework of this study, two testing are conducted to determine the presence of multicollinearity in the structural model. The first testing

involves five variables, namely, product quality, trust, cooperation, communication, and commitment, and the exogenous variable of customer loyalty. The analysis results for multicollinearity are presented in Table 4.5. The second testing involves four variables, specifically product quality, trust, cooperation and communication, and the exogenous variable of commitment. The analysis results of multicollinearity are shown in Table 4.6. Based on the analysis results in Table 4.5 and Table 4.6, all the variables have obtained VIF coefficients less than 5, which imply that multicollinearity is not significantly present in the structural model. Thus, it can be concluded that multicollinearity problem is not significantly present in the structural model of this study. Detailed analysis results for multicollinearity are shown in Appendix G.

Table 4.5

Analysis results for multicollinearity (with exogenous variable of customer loyalty)

Variable	**VIF coefficient**
Product quality	1.333
Trust	1.622
Cooperation	1.687
Communication	1.669
Commitment	1.476

Table 4.6

Analysis results for multicollinearity (with exogenous variable of commitment)

Variable	VIF coefficient
Product quality	1.311
Trust	1.576
Cooperation	1.650
Communication	1.563

4.3 Descriptive Analysis

Descriptive statistics are one of the statistical analyses which help to simplify and describe large amount of data into the form that is easy to understand and interpret. In this study, descriptive statistics of frequency distribution is adopted to describe data for demographic profile of organizations, and respondents. Descriptive statistics of mean, maximum, minimum, and standard deviation are adopted to analyze data for six variables of this study, namely customer loyalty, product quality, trust, cooperation, communication, and commitment.

4.3.1 Demographic Profile of Organizations

According to the survey questionnaire, there are five characteristics of demographic profiles for organizations, which are the E&E sub-sector, total employees, years of operation, annual sales turnover for year 2016, and types of ownership. These

characteristics are summarized and described, into meaning form for easy understanding and interpretation, by frequency distribution. The data is presented in the form of frequency of occurrences and percentage, as shown in Table 4.7.

Table 4.7

Demographic profile of organizations

Demographic	**Characteristics**	**Organizations**	
		Frequency	Distribution (%)
E&E Sub-sector	Electronic components	104	39.0
	Industrial electronics	64	24.0
	Consumer electronics	60	22.4
	Electrical products	39	14.6
Total employees	Less than 50	23	8.6
	50 to 150	44	16.5
	151 to 500	96	36.0
	501 to 1000	59	22.1
	More than 1000	45	16.8
Years of operation	Less than 3	7	2.6
	3 to 5	14	5.2
	6 to 10	37	13.9
	11 to 15	54	20.2
	More than 15	155	58.1
Annual sales Turnover (2016)	Less than RM10 million	30	11.2
	RM10 million to RM25 million	63	20.6
	RM26 million to RM50 million	100	37.5
	More than RM50 million	74	30.7
Type of ownership	Fully local (100%)	122	45.7
	Fully foreign (100%)	74	27.7
	Local (51% to 99%)	22	8.2
	Foreign (51% to 99%)	36	13.5
	Local-Foreign (50%-50%)	13	4.9

a) *E&E sub-sector*. Electronics component has the most responses, which constitutes 39 percent of the total responses. It follows by industrial electronics, and consumer electronics, which compose of 24.0 percent and 22.4 percent respectively. Electrical products have the least responses, which constitutes 14.6 percent, among the four E&E sub-sectors. Detailed results of the descriptive analysis for E&E sub-sector are shown in Appendix H1.

b) *Total employees*. This characteristic reflects the size of organization. In this study, the questionnaire survey collects data from five sizes of organizations, namely with total employees less than 50, in-between 50 to 150, in-between 151 to 500, in-between 501 to 1000, and more than 1000. Organizations with total employees in-between 151 to 500 have the most responses, which constitutes of 36.0 percent of the total responses. It is followed by organizations with total employees in-between 501 to 1000, which are represented by 22.1 percent. Organizations with total employees in-between 50 to 150, and more than 1000 constitute 16.5 percent and 16.8 percent of the responses respectively. Organizations with total employees less than 50 have the least responses, which comprise of 8.6 percent. Detailed results of the descriptive analysis for total employees are shown in Appendix H2.

c) *Years of operation*. More than half of the organizations, which participated in this study, have been operating more than 15 years. They represent 58.1 percent of the total responses. It follows by organizations that have been operating between 11 to 15 years, and six to ten years, which represent 20.2 percent and 13.9 percent respectively. Organizations with years of operation between three to five, and less than three years

have relatively lower responses, which amount to 5.2 percent and 2.6 percent respectively. Detailed results of the descriptive analysis of years of operation are shown in Appendix H3.

d) Annual sales turnover (2016). This characteristic refers to the total among of sales achieved by the organizations in year 2016. There are four categories of annual sales turnover, of which organizations with annual sales turnover between RM26 million to RM50 million has the most responses. It records 37.5 percent of the total responses. It follows by organizations with annual sales turnovers more than RM50 million, and in-between RM10 million to RM25 million, which recorded 30.7 percent and 20.6 percent respectively. Organizations with annual sales turnover less than RM10 million have the least responses, which are represented by 11.2 percent. Detailed results of the descriptive analysis for annual sale turnover (2016) are shown in Appendix H4.

e) Type of ownership. Fully local (100%) ownership has the most responses, where is represented by 45.7 percent of total responses. It follows by fully foreign (100%) ownership with 27.7 percent. Organizations with ownerships of foreign (51% to 99%) and local (51% to 99%) are represented by 13.5 percent and 8.2 percent respectively. Organizations with local-foreign (50% to 50%) ownership have the least responses, which are represented by 4.9 percent of responses. Detailed results of the descriptive analysis for type of ownership are shown in Appendix H5.

4.3.2 Demographic Profile of Respondents

Frequency distribution is similarly used to analyze 267 set of survey questionnaire data for demographic profiles of respondents, which consists of positions of respondents in the firms, tenure in the firms, education level, and age. The data is presented in the form of frequency of occurrences and percentage, as shown in Table 4.8.

Table 4.8

Demographic profile of respondents

Demographic	**Characteristics**	**Organizations**	
		Frequency	Distribution (%)
Position in firm	General Manager or Factory Manager	43	16.1
	Manager	113	42.3
	Senior Staff	111	41.6
Tenure in the firm	Less than 5 years	105	39.3
	Between 5 to 10 years	77	28.8
	Between 11 to 15 years	51	19.1
	More than 15 years	34	12.7
Education Level	Certificate/Diploma	65	24.3
	First degree	120	44.9
	Postgraduate degree	70	26.2
	Professional certification	12	4.5
Age	Below 30	21	7.9
	Between 30 to 40	98	36.7
	Between 41 to 50	114	42.7
	Above 50	34	12.7

a) Position in firm. There are three characteristics of positions, which are the senior management comprising of general manager and factory manager, middle level management consisting of managers, and executives covering for senior staffs that have decision making capacity in supplier management. Majority of the responses are represented by middle level management and executives, which constitutes 42.3 percent, and 41.6 percent respectively. It follows by senior management, which has the least responses. It is represented by 16.1 percent. Detailed results of the descriptive analysis for position in firm are shown in Appendix I1.

b) Tenure in the firm. Respondents with less than five years of experiences have the highest representations. They are represented by 39.3 percent. The other three categories are between five to ten years, between 11 to 15 years, and more than 15 years are represented by 28.8 percent, 19.1 percent, and 12.7 percent respectively. Category of more than 15 years has the least representation. Detailed results of the descriptive analysis for years of experience in the firm are shown in Appendix I2.

c) Education level. Majority of respondents possess first degrees. They are represented by 44.9 percent of the total responses. Respondents with postgraduate degree, and with certificate and diploma are represented by 26.2 percent, and 24.3 percent respectively. Respondents with professional certification constitute 4.5 percent. Detailed results of the descriptive analysis for education level are shown in Appendix I3.

d) Age. Majority of respondents have age in-between 41 to 50 years. They are

represented by 42.7 percent. Respondents with ages in-between 30 to 40 years, and with more than 50 years constitute the second and third largest representations respectively. Respondents with ages in-between 30 to 40 years are represented by 36.7 percent, while respondents with ages more than 50 years are represented by 12.7 percent. Respondents with ages below 30 years have the least representation with 7.9 percent. Detailed results of the descriptive analysis for age are shown in Appendix I4.

4.3.3 Descriptive Analysis of Variables

Descriptive analysis of variables involves analyzing and transforming 267 sets of data from the returned survey questionnaires into descriptive statistics of mean, maximum, minimum, and standard deviation. The analysis involves six variables, of which one dependent variable is customer loyalty, four predictor variables are product quality, trust, communication, and cooperation, and one mediating variable is commitment. Customer loyalty is measured by five items, product quality, cooperation, and communication are measured by six items each, and trust with ten items. Commitment is measured by six items. All six variables are rated with seven-point Likert scale, where 1 represents "strongly disagree" and 7 represents "strongly agree". Table 4.9 presents the descriptive statistics of total items, mean, maximum, minimum, and standard deviation for the six variables.

Table 4.9

Descriptive analysis of variables

Variable	Number of items	Mean	Minimum	Maximum	Standard deviation
Customer loyalty	5	6.16	4	7	0.567
Product quality	6	6.22	5	7	0.561
Trust	10	6.00	4	7	0.630
Cooperation	6	6.08	4	7	0.603
Communication	6	5.95	4	7	0.626
Commitment	6	6.16	4	7	0.579

Based on the descriptive analysis results in Table 4.7, among the four predictor variables, product quality has the highest mean value of 6.22, and communication has the lowest mean value of 5.95. The mediating variable (commitment) has mean value of 6.16, and standard deviation of 0.579. The dependent variable (customer loyalty) has mean value of 6.16, and standard deviation of 0.567. Based on the seven-point Likert scale, all mean values fall in-between rating of 5 (slightly agree) and 7 (strongly agree). These results indicate that respondents agree that customer loyalty, product quality, trust, cooperation, communication, and commitment are important factors in their business. Detailed results of the descriptive analysis for customer loyalty, product quality, trust, cooperation, communication, and commitment are shown in Appendix J1, Appendix J2 Appendix J3, Appendix J4, Appendix J5, and Appendix J6 respectively.

4.4 PLS-SEM Model Analysis

PLS-SEM analysis consists of two-step approach, where the first step involves estimating the measurement model, and the second step includes assessment of structural model. The second step should be initiated after the first step has determined that the measurement model is valid and accurate. This study adopts the recommendations from Hair et al. (2014) to estimate the measurement model by testing the indicator reliability, composite reliability, convergent validity and discriminant validity. Assessment of structural model involves determining the path coefficients, significant of relationships, and predictive accuracy.

4.4.1 Estimating Measurement Model

PLS-SEM measurement model, which is also known as outer measurement model, consists of relationships between latent variables, and observable items. The latent variables are not observable directly in SEM analysis, but they are connected to observable items that can be measured directly, thereby, making the latent variables measurable (Byrne, 1998). Hair et al. (2014) recommended four tests to ensure that latent variables are measured reliably and accurately. The four tests are indicator reliability, composite reliability, convergent validity and discriminant validity.

Figure 4.1 shows the measurement model that consists of relationships between latent variables and observable items of this study. There are two endogenous constructs, and four exogenous constructs. The endogenous constructs are customer loyalty and commitment, and the four exogenous constructs are product quality, trust, cooperation,

and communication. Each of the constructs has latent variables connected to their respective observable items. Following the recommendations from Hair et al. (2014), indicator reliability, composite reliability, convergent validity and discriminant validity can be tested on each of the construct to determine the measurement model is reliable, valid, and accurate prior to initiating the structural model assessment.

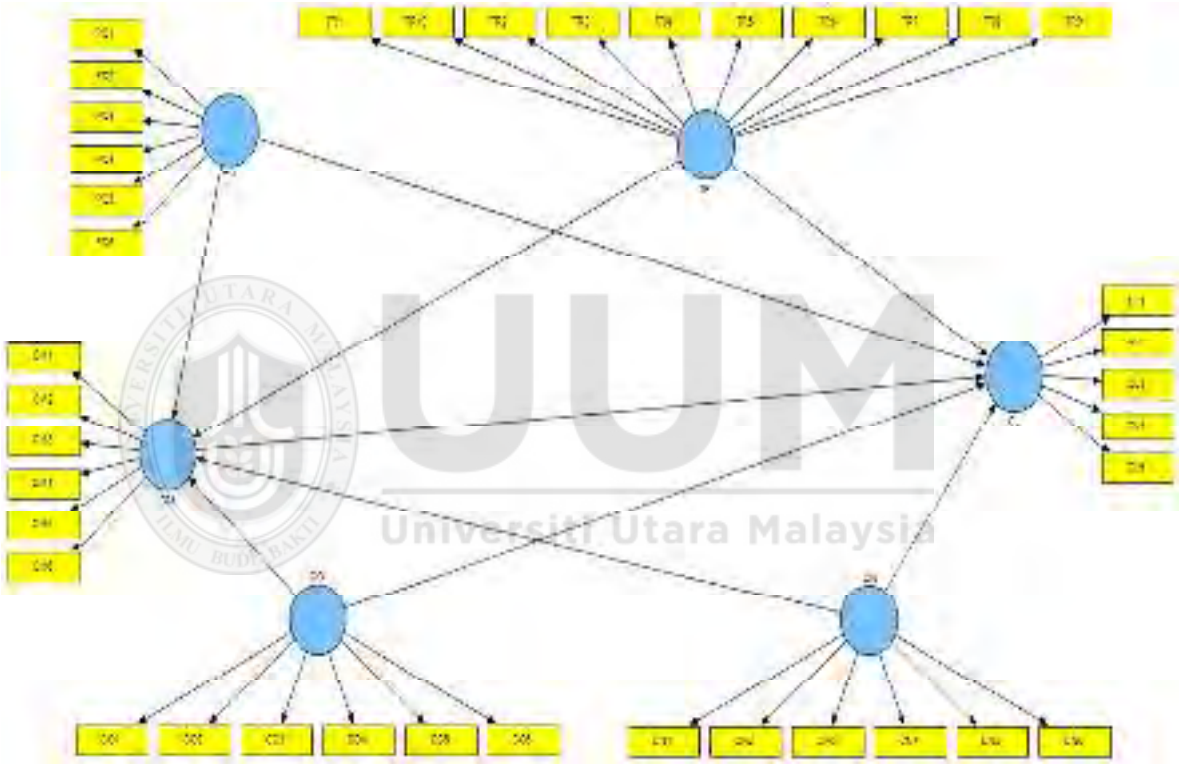

Figure 4.1

Measurement model

4.4.1.1 Test of Indicator Reliability

Indicator reliability is an important measure to determine how well an observable item

reflects on the latent variable. It measures how much variance contributed or shared by the observable items to the latent variable. Falk and Miller (1992) pointed out that indicator reliability can be determined from outer loading of the observable item. Accordingly, an observable item has acceptable indicator reliability, if its outer loading is greater than 0.70. Observable item with outer loading less than 0.50 is considered to have unacceptable indicator reliability. It should be removed from the PLS-SEM analysis. Hair et al, (2014) argued that observable item with outer loading in-between 0.50 to 0.70 should be investigated to determine whether they can be deleted or retained according to the AVE and composite reliability. The affected observable item should be considered to have unacceptable indicator reliability, if its removal can enhance the AVE and composite reliability above the threshold limits of 0.50, and 0.70 respectively. It should be removed from the PLS-SEM analysis. Alternatively, the observable item is considered to have acceptable indicator reliability, if the AVE and composite reliability have already been achieved the threshold limits of 0.50, and 0.70 respectively. It should not be removed from the PLS-SEM analysis. This study adopts the threshold limits recommended by Falk and Miller (1992) to test indicator reliability, and the recommendation from Hair et al. (2014) to determine removal and retention of observable items, which have outer loadings in-between 0.50 to 0.70, in the PLS-SEM analysis.

Using PLS-SEM software SmartPLS 3.0 (Ringle et al., 2015), all the 39 observable items from the six variables (customer loyalty, product quality, trust, cooperation, communication, and commitment) are analyzed for indicator reliability in this study.

Customer loyalty has two observable items with acceptable indicator reliability, where their outer loadings are greater than 0.70, and hence, they are retained in the PLS-SEM analysis. Observable item CL1, CL4 and CL5 have outer loadings in-between 0.50 and 0.70. When the observable item CL1, which has the lowest outer loading, is removed from the analysis, the AVE and composite reliability have increased, and exceeded their threshold limits of 0.50, and 0.70 respectively. Thus, observable item CL1 is deemed to have unacceptable indicator reliability, and removed from the PLS-SEM analysis. The final analysis has confirmed that observable items CL2, CL3, CL4 and CL5 have outer loadings greater than 0.70. The outer loading, AVE and composite reliability that generated from observable item CL2, CL3, CL4, and CL5 are presented in Table 4.10. Similar analyses are performed for product quality, trust, cooperation, communication and commitment, and observable items that are retained in the PLS-SEM analysis are presented in Table 4.10. Product quality retains four observable items (PQ1, PQ3, PQ4, and PQ5), and removes two observable items (PQ2, and PQ6) with unacceptable indicator reliability. Trust retains four observable items (TR2, TR5, TR6, and TR7), and deleted six observable items (TR1, TR3, TR4, TR8, TR9, and TR10) with unacceptable indicator reliability. Cooperation retains five observable items (CO2, CO3, CO4, CO5, and CO6), and deletes one observable item (CO1) with unacceptable indicator reliability. Observable items CO2 and CO6 with outer loadings of 0.660 and 0.615 respectively are retained because the AVE and composite reliability have already achieved the threshold limits of 0.50 and 0.70 respectively. Communication retains four observable items (CN1, CN4, CN5, and CN6), and removes two observable items (CN2, and CN3) with unacceptable indicator reliability. Observable item CN1 with outer loading of 0.644 is

retained because the AVE and composite reliability have already achieved the threshold limits of 0.50 and 0.70 respectively. Finally, commitment retains four observable items (CM1, CM2, CM3, and CM6), and removes two observable items (CM4, and CM5) with unacceptable indicator reliability. Detailed analysis results of indicator reliability are shown in Appendix K1, and Appendix K2.

Table 4.10

Analysis results for indicator reliability

Variable	Measurement item	Indicator reliability	AVE	Composite reliability
Customer loyalty (CL)	CL2	0.776	0.533	0.820
	CL3	0.738		
	CL4	0.701		
	CL5	0.701		
Product quality (PQ)	PQ1	0.674	0.527	0.816
	PQ3	0.707		
	PQ4	0.750		
	PQ5	0.769		
Trust (TR)	TR2	0.708	0.536	0.822
	TR5	0.711		
	TR6	0.775		
	TR7	0.766		
Cooperation (CO)	CO2	0.660	0.509	0.837
	CO3	0.774		
	CO4	0.776		
	CO5	0.728		
	CO6	0.615		
Communication (CN)	CN1	0.644	0.522	0.830
	CN4	0.723		
	CN5	0.834		
	CN6	0.758		
Commitment (CM)	CM1	0.720	0.518	0.811
	CM2	0.728		
	CM3	0.725		
	CM6	0.704		

4.4.1.2 Test of Composite Reliability

Although the indicator reliability is useful to identify which individual observable item is adequately measuring the latent variable, it is also important that all the observable items jointly measure the latent variable reliably (Bagozzi & Yi, 1988). This measurement can be assessed by composite reliability or Cronbach's alpha, which determine how well all the observable items measure the latent variable reliably and adequately. Composite reliability is preferred over Cronbach's alpha in the PLS-SEM analysis of this study, because it can accommodate different outer loadings, which are commonly encountered in PLS-SEM analysis, and thus, avoid underestimating the internal consistency reliability (Hair el al., 2014). Construct with composite reliability greater than 0.70 indicates that the internal consistency reliability is adequate (Nunnally, 1978). This study adopts the recommendation from Nunnally (1978) to test composite reliability for constructs of customer loyalty, product quality, trust, cooperation, communication, and commitment.

The composite reliability for customer loyalty, product quality, trust, cooperation, communication, and commitment are analyzed using PLS-SEM software SmartPLS 3.0 (Ringle et al., 2015) in this study. Analysis results for the six variables are shown in Table 4.10. Based on the findings, all six composite reliability exceed the threshold limit of 0.70, which indicate that internal reliability has been established in all the six constructs. Detailed analysis results for composite reliability analysis are shown in Appendix K2.

4.4.1.3 Test of Convergent Validity

According to Henseler, Ringle and Sinkovics (2009), convergent validity can be demonstrated through uni-dimensionality of observable items that are reflecting the respective constructs. Hair et al. (2013) demonstrated that convergent validity can be measured by AVE, which is an average value of squared outer loadings of observable items related with the affected construct. Accordingly, the AVE threshold limit should be greater than 0.50 for the affected construct to achieve adequate convergent validity. The AVE value of greater than 0.50 implies that the affected latent variable accounts at least 50 percent of the observable items' variance in the affected construct. This study adopts the recommendation from Hair et al. (2013) to test the convergent validity on the six constructs, namely customer loyalty, product quality, trust, cooperation, communication, and commitment.

The analysis results for convergent validity in Table 4.10 demonstrated that all the six constructs have AVE values greater the threshold limit of 0.50. The AVE values range from 0.509 to 0.536, where trust has the highest AVE value of 0.536, and cooperation has the lowest AVE value of 0.509. Each of the six latent variables has accounted more than half of their respective observable items' variances. Therefore, it is concluded that all the six constructs have established adequate convergent validity. Detailed analysis results for AVE are shown in Appendix K2.

4.4.1.4 Test of Discriminant Validity

According to Hair et al. (2013), discriminant validity can be described as the extent

where observable items in an affected construct are different compare to other observable items, as they do not overlap with them. It refers to the degree to which constructs are distinct from one another. Fornell and Larcker (1981) pointed out that discriminant validity of an affected construct can be determined by comparing its square root AVE value against the bivariate correction values with all other constructs in the research model. Accordingly, discriminant validity is deemed established, when the square root AVE value is greater than all the bivariate correlation values with all other latent variables in the research model. This study adopts the recommendation from Fornell and Larcker (1981) to determine the discriminant validity for all the six latent variables, namely customer loyalty, product quality, trust, cooperation, communication, and commitment.

Table 4.11

Analysis results for discriminant validity

Latent variable	**CL**	**PQ**	**TR**	**CO**	**CN**	**CM**
Customer loyalty (CL)	**0.730**					
Product quality (PQ)	0.438	**0.726**				
Trust (TR)	0.377	0.398	**0.741**			
Cooperation (CO)	0.478	0.393	0.536	**0.713**		
Communication (CN)	0.386	0.409	0.482	0.525	**0.743**	
Commitment (CM)	0.500	0.364	0.440	0.442	0.486	**0.720**

Note: Diagonals (**bolded**) represent the square root AVE values, and off-diagonals represent bivariate correlations values.

Table 4.11 presents the square root AVE and bivariate correlation values for all the six latent variables. Based on the analysis results, customer loyalty has square root AVE value of 0.730, which is greater than its bivariate correlation values with product quality (0.438), trust (0.377), cooperation (0.478), communication (0.386), and commitment (0.500). Product quality has square root AVE value of 0.729, which is greater than its bivariate correlation values with customer loyalty (0.438), trust (0.398), cooperation (0.393), communication (0.409), and commitment (0.364). Trust has square root AVE value of 0.741, which is greater than its bivariate correlation values with customer loyalty (0.377), product quality (0.438), cooperation (0.536), communication (0.482), and commitment (0.440). Cooperation has square root AVE value of 0.713, which is greater than its bivariate correlation values with customer loyalty (0.478), product quality (0.393), trust (0.536), communication (0.525), and commitment (0.442). Commitment has square root AVE value of 0.732, which is greater than its bivariate correlation values with customer loyalty (0.500), product quality (0.364), trust (0.440), communication (0.486), and cooperation (0.442). Therefore, it can be considered that all the six latent variables have established discriminant validity. Detailed analysis results for discriminant validity are shown in Appendix L.

4.4.1.5 Summary of Estimation of Measurement Model

The measurement model consists of two endogenous constructs, and four exogenous constructs. The endogenous constructs are customer loyalty, and commitment. The exogenous constructs are product quality, trust, cooperation, and communication. Each of the construct is related and measured by its respective observable items. At the initial

stage, there are five observable items are connected to, and measure customer loyalty, six observable items each are connected to, and measure product quality, cooperation, communication, and commitment respectively, and ten observable items are connected to and measure trust. In order to achieve indicator reliability, customer loyalty, product quality, trust, communication, and commitment retain four observable items respectively. Cooperation retains five observable items. Composite reliability analysis has demonstrated that each of the six constructs has established sufficient internal reliability. Subsequent testing for convergent validity and discriminant validity has demonstrated that both validities, namely convergent validity and discriminant validity, are adequately established on all the six constructs. In conclusion, the measurement model comprising six constructs (customer loyalty, product quality, trust, cooperation, communication, and commitment) has been proven reliable, and valid for subsequent assessment of structural model.

4.4.2 Assessing Structural Model

Structural model is also known as inner model in PLS-SEM. It consists of relationships between latent variables. The goal is to assess the relationships, and to test hypotheses. The assessment of structural model should be initiated, only after the estimation of measurement model has been completed, and proven that the measurement model is valid, and accurate. This is to ensure reliable and valid data is utilized by the structural model analysis to yield accurate and meaningful results. The assessment of structural model involves determining the path coefficients, significant of relationships, and predictive accuracy in this study.

4.4.2.1 Determining the Path Coefficients, and Significance of Relationships

The assessment of structural model begins by determining the path coefficients and significance of relationships in structural model. Hair et al, (2013) recommended that, for a relationship to be significant and relevant, the path coefficient must meet two statistical requirements. The first statistical requirement is related to the t-statistic, which its value must be greater than the predefined value. The second statistical requirement is related to significant level, which the value must be lesser than the predefined significant level. A relationship with statistical significant supports the hypothesis established in the study. Alternatively, a relationship with no statistical significant does not support the hypothesis. This study adopts the requirements recommended by Hair et al. (2013) to determine the significant of relationships in the structural model. The statistical analysis is performed at with predefined t-statistic 1.645 (significant level of 0.05), and 2.33 (significant level of 0.01) for one-tail testing. In addition, this study applies bootstrapping procedure with 4,999 re-samplings, as recommended by Henseler et al. (2016), to approximate the t-statistic, since PLS-SEM analysis is not parametric.

Figure 4.2 presents the structural model of this study. It consists of nine hypothesized relationships, which are denoted by H1, H2, H3, H4, H5, H6, H7, H8, and H9 respectively. The relationships with statistical significant are marked with asterisk (*), where * indicates the relationship is significant at the predefined t-statistic of 1.645 (significant level of 0.05), and ** indicates the relationship is significant at the predefined t-statistic of 2.33 (significant level of 0.01) for one-tail testing. Based on the analysis results, seven relationships are significant, and two relationships are not significant. The

seven relationships with statistical significance are product quality-customer loyalty, cooperation-customer loyalty, commitment-customer loyalty, product quality-commitment, trust-commitment, cooperation-commitment, and communication-commitment. Therefore, H1, H2, H3, H5, H6, H7, and H9 are supported. The two relationships with no statistical significance are trust-customer loyalty, and communication-customer loyalty. Hence, H4 and H8 are not support.

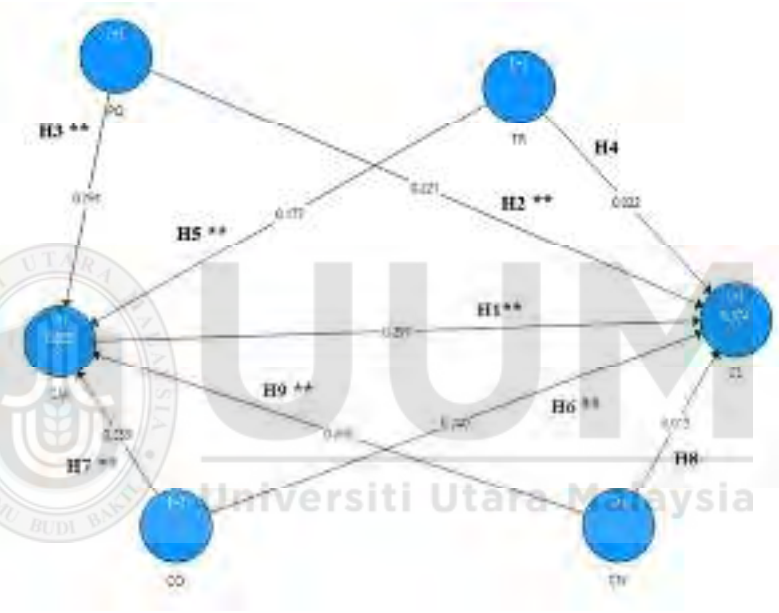

Figure 4.2

Structural model

Table 4.12 summarized the analysis results for the nine hypothesized hypotheses. With respect to the significant relationships toward customer loyalty, the relationship commitment-customer loyalty has the highest beta value (0.297), which is the path coefficient, compares to the relationships cooperation-customer loyalty (0.240), and product quality-customer loyalty (0.221). The path coefficients indicate the relative important of independent variables in predicting the dependent variable (Hair et al.,

2013). Thus, it is evident that commitment is the most important independent variable, follows by product quality and cooperation, in predicting customer loyalty. In addition, all three path coefficients are positive indicating the relationships are direct and positive. Similar analyses for the four significant relationships toward commitment indicate the relationship communication-commitment has the highest path coefficient (0.268), compares to trust-commitment (0.177), cooperation-commitment (0.259), and product quality-commitment (0.291). Thus, it is obvious that communication is the most important independent variable in predicting commitment, follows by trust, cooperation, and product quality. Additionally, all four path coefficients are positive, which imply the four relationships are positive and direct relationships. Detailed analysis results for path coefficient are shown in Appendix M.

Table 4.12

Analysis results for path coefficients and direct relationships

Hypothesis	Relationship	Beta	t-statistic	p-value	Finding
H1	Commitment → Customer loyalty	0.297	4.698	0.000 **	**Supported**
H2	Product quality → Customer loyalty	0.221	4.061	0.000 **	**Supported**
H3	Product quality → Commitment	0.291	4.061	0.000 **	**Supported**
H4	Trust → Customer loyalty	0.022	0.364	0.358	Not supported
H5	Trust → Commitment	0.177	2.607	0.005 **	**Supported**
H6	Cooperation → Customer loyalty	0.240	3.936	0.000 **	**Supported**
H7	Cooperation → Commitment	0.259	4.625	0.000**	**Supported**
H8	Communication → Customer loyalty	0.015	0.223	0.412	Not supported
H9	Communication → Commitment	0.268	3.836	0.000 **	**Supported**

Note: t-statistic (significant level) for significant: 1.645 ($p<0.05$)*, and 2.33 ($p<0.01$)**

4.4.2.3 Determining Predictive Accuracy

Predictive accuracy of structural model can be determined by the coefficient of determination (R^2). In statistical term, R^2 represents the amount of variance in the dependent variables that is contributed by the significant independent variables linked to it. R^2 has value of zero to one, where higher value of R^2 implies the structural model has higher predictive accuracy (Hair et al., 2013). Based on classification by Cohen (1988), R^2 value of 0.26, 0.13 and 0.02 indicates substantial, moderate and weak level of predictive accuracy respectively. Falk and Miller (1992) considered that R^2 value must be greater than 0.10 for the explained variance in the dependent variable to be significant and adequate. This study adopted the R^2 classifications, and requirement recommended by Cohen (1988), and Falk and Miller (1992) respectively.

With reference to the research framework of this study, two analyses are conducted to determine the predictive accuracy of the structural model. The first analysis involves determining the predictive accuracy for the construct involving commitment, as exogenous variable, and predictor variables link to it. The R^2 value is determined and classified according to the three categorizes of predictive accuracy recommended by Cohen (1988). The second analysis is similarly performed for construct involving customer loyalty, as exogenous variable, and predictor variables link to it. Likewise, the R^2 value is determined and classified according to the three categories of predictive accuracy as recommended by Cohen (1988). In both analyses, the R^2 values should be greater than 0.10 for the respective accountable variances in the exogenous variables to be considered significant and adequate (Falk & Miller, 1992).

Table 4.13 presents the predictive accuracy analysis results for exogenous variables, namely commitment and customer loyalty. Based on the analysis results, commitment has R^2 value of 0.322**,** which is greater than the recommended requirement of 0.10 (Falk & Miller, 1992). The predictive accuracy is greater than 0.26, which can be classified as substantial. Therefore, the predictive accuracy for the construct involving commitment, as exogenous variable and its predictors is determined significant, and considered as substantial. The R^2 value for the construct involving customer loyalty, as exogenous variable and its predictors is determined to be 0.374**,** which is greater than the requirement of 0.10 as recommended by Falk and Miller (1992). The determined R^2 value is greater than 0.26, as such, the predictive accuracy for the construct involving customer loyalty, as exogenous variable, and its predictors can be classified as substantial. Thus, the predictive accuracy for the construct involving customer loyalty, as exogenous variable and its predictors is deemed significant, and substantial. Detailed analysis results for predictive analysis for the exogenous variables, namely commitment and customer loyalty, are shown in Appendix N.

Table 4.13

Analysis results for predictive analysis

Exogenous variable	Independent variable	R^2	R^2 Adjusted	Classification
Commitment	Product quality Trust Cooperation Communication	0.322	0.312	Substantial and significant
Customer loyalty	Commitment Product quality Cooperation	0.374	0.362	Substantial and significant

4.4.2.4 Summary of Structural Model Assessment

Assessment of structural model involves determining the path coefficients and significant of relationships between variables in the structural model. Findings from the structural model assessment are used to test hypotheses in the study. The assessment of structural model begins by determining the path coefficients and significant of relationships in the structural model. Applying the bootstrapping procedure with 4,999 re-samplings, the t-statistics and significant level are determined and compare against the predefined levels (t-statistic of 1.645 for one-tail testing and significant level of 0.05, and t-statistic of 2.33 for one-tail testing and significant level of 0.01). Analysis findings indicate that seven relationships are statistically significant, and two relationships are not statistically significant. The seven significant relationships are product quality–customer loyalty, cooperation-customer loyalty, commitment-customer loyalty, product quality-

commitment, trust-commitment, cooperation-commitment, and communication-commitment. The two insignificant relationships are trust-customer loyalty, and communication-customer loyalty. It is determined that H1, H2, H3, H5, H6, H7, and H9 are supported, and H4 and H8 are not supported. Path coefficients for all seven significant relationships are positive, which indicate the predictors and dependent variables are positively and directly related in the respective relationships.

With reference to the research framework of this study, two analyses are conducted to determine the predictive accuracy of the structural model. The first analysis involves determining the predictive accuracy for the construct involving commitment, as exogenous variable, and predictor variables link to it. The second analysis is similarly performed for construct involving customer loyalty, as exogenous variable, and predictor variables link to it. According to the recommendations by Cohen (1988), and Falk and Miller (1992), the analyses have determined that predictive accuracy for the construct involving commitment, as exogenous variable, and its predictor variables is classified as substantial, and determined significant. Similar findings for the construct involving customer loyalty as exogenous variable and all predictor variables link to it, where the predictive accuracy is classified as substantial, and determined significant.

4.4.3 Test of Mediation Effects

Mediation can happen when the influence of predictor is transmitted to mediator, which in turn, transfers it (influence) to the dependent variable. It involves two relationships, namely relationship predictor-mediator (a), and mediator-dependent variable (b).

According to Preacher and Hayes (2008), the two relationships must be statistically significant for the mediation effect to occur. Additionally, mediation effect may happen even though the direct relationship between the predictor and dependent variable is not statistically significant (Preacher and Hayes, 2008). Hayes (2009) pointed out that bootstrapping test can be used to analyze the effect of mediation by generating the empirical distribution for the mediation effect (a x b). The bootstrapping test relies on 95 percent confident interval, where the upper bound and lower bound are 97.25 percent, and 2.5 percent respectively. Accordingly, the determined confident interval must not include zero for the mediation effect to occur, and deem significant. If the confident interval does include zero, the mediation effect is considered not established and deemed not significant. This study adopts the requirements from Henseler et al. (2016) for bootstrapping procedure with 4,999 re-samplings, and Preacher and Hayes (2008), and Hayes (2009) to analyze the presence of mediation effects.

Table 4.14 presents the analysis results for mediation effects on the four paths, namely product quality-commitment-customer loyalty, trust-commitment-customer loyalty, cooperation-commitment-customer loyalty, and communication-commitment-customer loyalty. The bootstrapping test produces confident interval of 0.011 to 0.099 for the path product quality-commitment-customer loyalty, 0.013 to 0.105 for the path trust-commitment-customer loyalty, 0.015 to 0.108 for the path cooperation-commitment-customer loyalty, and 0.033 to 0.138 for the path communication-commitment-customer loyalty. All the confident intervals do not include zero. Mediation effects occur on all the four paths, namely product quality-commitment-customer loyalty, trust-commitment-customer loyalty, cooperation-commitment-customer loyalty, and communication-

commitment-customer loyalty. Therefore, it can be concluded that commitment mediates the relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty. H10, H11, H12, and H13 are supported. Detailed analysis results for mediation analysis are shown in Appendix O.

Table 4.14

Analysis results for mediation effects

Hypothesis	Path	Indirect effect (a x b)	t-statistic	p-value	Bootstrapped confidence interval		Finding
					Upper bound	Lower bound	
H10	PQ → CM → CL	0.086	2.975	0.005 **	0.011	0.099	**Supported**
H11	TR → CM → CL	0.053	2.247	0.025 *	0.013	0.105	**Supported**
H12	CO → CM → CL	0.077	2.471	0.009 **	0.015	0.108	**Supported**
H13	CN → CM → CL	0.080	2.971	0.003**	0.033	0.138	**Supported**

Note: t-statistic (confident intervals) for significant: 1.96 ($p<0.05$)*, and 2.58 ($p<0.01$)**

According to Nitzl et al. (2016), there are two different kinds of mediations, namely full mediation and partial mediation. Full mediation can occur, when the direct relationship between predictor and dependent variable is not significant but the mediation effect is significance. The effect of predictor is fully transmitted to dependent variable via the mediator. Partial mediation happens when the direct relationship between predictor and dependent variable is significant, and as well as the mediation effect. The effect of

predictor is partially transmitted to dependent variable through the mediator, in addition its direct effect on dependent variable.

Based on Nitzl et al. (2016) explanation, full mediations occurs on the path trust-commitment-customer loyalty, and communication-commitment-customer loyalty. The direct effects of trust and communication on customer loyalty are not significant respectively, but the mediation effects of commitment are significant on both the paths. The effects of trust and communication are fully transmitted to customer loyalty through commitment. Therefore, it can be considered that the relationships between trust and customer loyalty, and communication and customer loyalty are fully mediated by commitment. Applying the explanation from Nitzl et al. (2016), partial mediations happen on the path product quality-commitment-customer loyalty, and cooperation-commitment-customer loyalty. The direct relationship between product quality and customer loyalty is significant, and as well as the mediation effect of commitment is significant in this relationship. The effect of product quality is partially transmitted to customer loyalty via commitment, in addition its (product quality) direct effect on customer loyalty. Likewise, the direct relationship between cooperation and customer loyalty is significant, and the mediation effect of commitment is significant in this relationship. The effect of cooperation is partially transmitted to customer loyalty through commitment, in addition its (cooperation) direct effect on customer loyalty. Therefore, it can be considered that the relationships between product quality and customer loyalty, and cooperation and customer loyalty are partially mediated by commitment.

Applying the recommendation from Hair et al. (2017), the mediation effects of commitment can be determined by the VAF index. The VAF index is computed by dividing the indirect effect with the total effect, which consists of indirect effect and direct effect. According to Hair et al. (2017), no mediation occurs in the relationship, if the determined VAF index has value lesser than the threshold limit of 0.20, partial mediation is present if the determined VAF index has value in-between 0.20 to 0.80, and full mediation exists when the determined VAF index has value greater than 0.80. This study applies the recommendation from Hair et al. (2017) to determine the mediation effect of commitment on the four relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty.

Table 4.15

VAF index analysis results for mediation effects

Path	**Indirect effect**	**Direct effect**	**Total effect**	**VAF**	**Mediation effect**
PQ → CM → CL	0.086	0.221	0.307	0.280	Partial mediation
TR → CM → CL	0.053	-	0.053	1.000	Full mediation
CO → CM → CL	0.077	0.240	0.317	0.243	Partial mediation
CN → CM → CL	0.080	-	0.080	1.000	Full mediation

Note: a) There is no direct effect for path trust-commitment-customer loyalty (TR-CM-CL), since the direct relationship between trust and customer loyalty is not significant. b) There is no direct effect for path communication-commitment-customer loyalty (CN-CM-CL), since the direct relationship between communication and customer loyalty is not significant.

Table 4.15 shows the VAF index values for the four paths, namely product quality-commitment-customer loyalty (PQ-CM-CL), trust-commitment-customer loyalty (Tr-CM-CL), cooperation-commitment-customer loyalty (CO-CM-CL), and communication-commitment-customer loyalty (CN-CM-CL). The path product quality-commitment-customer loyalty has VAF index value of 0.280, which indicates that commitment partially mediates the relationship between product quality and customer loyalty. The path trust-commitment-customer loyalty has VAF index value of 1.000 implying that the relationship between trust and customer loyalty is fully mediated by commitment. The path cooperation-commitment-customer loyalty has VAF index value of 0.243 indicating that commitment partially mediates the relationship between cooperation and customer loyalty. The path communication-commitment-customer loyalty has VAF index value of 1.000 evidencing that the relationship between communication and customer loyalty is fully mediated by commitment. The findings produce similar outcomes as the analysis recommended by Nitzl et al. (2016). Thus, it is concluded that commitment partially mediates the relationships between product quality and customer loyalty, and cooperation and customer loyalty, and fully mediates the relationships between trust and customer loyalty, and communication and customer loyalty.

4.5 Summary of Hypothesis Testing

A total of 13 hypotheses relationships are tested in this study. Using the PLS-SEM analysis, seven hypotheses are tested significant and two hypotheses are tested not significant. The seven supported hypotheses are H1, H2, H3, H5, H6, H7, and H9. The two unsupported hypotheses are H4 and H8. Analysis of mediation effect has supported

four hypotheses, which are H10, H11, H12, and H13. A recapitulation of hypotheses tested in this study is summarized in Table 4.16.

Table 4.16

Summary of hypothesis testing

Hypothesis	Statement of hypothesis	Finding
H1	Commitment has significant influence on customer loyalty	**Supported**
H2	Product quality has significant influence on customer loyalty	**Supported**
H3	Product quality has significant influence on commitment	**Supported**
H4	Trust has direct significant influence on customer loyalty	Not supported
H5	Trust has significant influence on commitment	**Supported**
H6	Cooperation has significant influence on customer loyalty	**Supported**
H7	Cooperation has significant influence on commitment	**Supported**
H8	Communication has significant influence on customer loyalty	Not supported
H9	Communication has significant influence on commitment	**Supported**
H10	Commitment significantly mediates the relationship between product quality and customer loyalty	**Supported**
H11	Commitment significantly mediates the relationship between trust and customer loyalty	**Supported**
H12	Commitment significantly mediates the relationship between cooperation and customer loyalty	**Supported**
H13	Commitment significantly mediates the relationship between communication and customer loyalty	**Supported**

4.6 Chapter Summary

Chapter Four starts by reviewing the survey data, which is randomly sampled from two sources, namely FMM Industry Directory (FMM, 2016) and MATRADE directory for computer hardware, consumer and industrial E&E products, telecommunication, and E&E parts and component (MATRADE, 2016). A total of 698 survey questionnaires are sent to the selected Malaysian E&E manufacturing firms, in order to meet the minimum sample size of 265 for this study. There are 276 survey questionnaires returned from the Malaysian E&E manufacturing firms, and after careful data screening for missing values, multiple inputs and illegible entries, a total of 267 survey questionnaires are verified to be valid, complete and usable for data analysis. The respond rate is computed, and determined as 38 percent.

Apart from the preliminarily data screening for missing values, multiple inputs and illegible entries, data screening for errors in data distribution normality, non-response bias, common method bias, and multicollinearity are also performed to ensure data is free from significant errors prior to initiating the data analysis for descriptive statistics, PLS-SEM, and mediation effects. Following the recommendation from Hair et al. (2007), skewness and kurtosis are adopted to analyze the normality of data distributions for the six variables, namely customer loyalty, product quality, trust, cooperation, communication, cooperation, and commitment. Accordingly, the skewness and kurtosis analyses have determined that data distributions for the six variables are distributed normally. Using the independent t-test, it is demonstrated that non-response bias is not significant between early respondents and late respondents. Harman's single-factor test

has confirmed that common method bias is not significant, and unlikely to yield measurement errors in this study. Analyses of VIF coefficients determine that the presence of multicollinearity is not significant present in the data.

Descriptive analysis is adopted to summarize data from the returned survey questionnaires. Frequency distribution analyzes the profile of organizations, and provides descriptive statistics for E&E subsector, organization size, years of operation, annual sales turnover (2016), and type of ownership. Similarly, distribution frequency analyzes the profile of respondents, and provides descriptive statistics for position in firm, tenure in the firm, education level, and age. Descriptive analysis determines the descriptive statistics of mean, minimum, maximum, and standard deviation for the six distributions, namely customer loyalty, product quality, trust, cooperation, communication, and commitment, in this study.

PLS-SEM analysis started with estimation of measurement model, which consists of testing for indicator reliability, composite reliability, convergent validity and discriminant validity. Testing of indicator reliability has determined that four observable items are retained to measure customer loyalty, product quality, trust, communication, and commitment respectively. Five observable items are retained to measure cooperation. Analysis of composite reliability has determined that internal reliability has been achieved for measurement instruments of the six variables. Subsequent testing for convergent validity and discriminant validity has confirmed that the both validities, namely convergent validity and discriminant validity, are established in the measurement model.

Assessment of PLS-SEM structural model is initiated, after the measurement model has been proven valid and accurate. Assessment of structural model begins by determining the path coefficient and significant of relationships in the structural model. Applying bootstrapping procedure with 4,999 re-samplings in the PLS-SEM analysis, t-statistics and significant levels are determined to test the significant of the nine relationships, which are hypothesized in this study. Analysis results indicate that seven relationships are significant, and two relationships are not significant. The seven significant relationships are product quality and customer loyalty, cooperation and customer loyalty, commitment and customer loyalty, product quality and commitment, trust and commitment, cooperation and commitment, and communication and commitment. The two insignificant relationships are trust and customer loyalty, and communication and customer loyalty. Thus, it is determined that H1, H2, H3, H5, H6, H7, and H9 are supported, and H4 and H8 are not supported. Path coefficients for all seven significant relationships are determined positive, which indicate the predictors and dependent variables are positively and directly related in the respective relationships. Analyses of predictive accuracy are performed, and determined that predictive accuracies of the structural model are classified as substantial, and significant.

Adopting the approach recommended by Preacher and Hayes (2008) to test the effect of mediation, analysis results demonstrate that commitment significantly mediates all four relationships, namely product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty. Thus, it is determined that H10, H11, H12, and H13 are supported. Following Nitzl et al. (2016) explanation, and analysis of VAF index recommended by Hair et al. (2017), two

relationships, namely between product quality and customer loyalty, and cooperation and customer loyalty, are found partially mediated by commitment. The other two relationships, namely between trust and customer loyalty, and communication and customer loyalty, are found fully mediated by commitment.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.0 Introduction

This is the final chapter of the dissertation. It starts with recapitulation of study with reference to the research objectives and research questions, and follows with discussions on the findings of this study, highlights of research implications, in which categorize into theoretical contributions and managerial contributions, and limitations of this study and recommendations for future studies. It ends with conclusion of this study.

5.1 Recapitulation of Study

This study is undertaken to investigate the influences of product quality and relational elements, namely trust, cooperation and communication, on customer loyalty, and the mediating effects of commitment in Malaysian E&E manufacturing industry. Product quality is an essential form of product differentiation, while trust, cooperation and communication are prominent relational elements of relationship marketing. The study is designed to investigate the direct influences of product quality, and relational elements, namely trust, cooperation, and communication, on customer loyalty, and indirect influences of product quality, and the three relational elements on customer loyalty via mediating effects of commitment. Two research questions are developed, and two corresponding research objectives are set at the early stage of this study. Thirteen (13) hypotheses are developed based the concepts of relationship marketing, product

differentiation, two underpinning theories, and supporting evidences from previous research studies, and test to determine answers for the research questions, and to meet the research objectives.

This study adopts quantitative research, where the sampling frame involves Malaysian E&E manufacturing firms listed in the Federation of Malaysian Manufacturers Industry Directory (FMM, 2016), and Malaysia External Trade Development Corporation (MATRADE) directory for computer hardware, consumer and industrial E&E products, telecommunication, and E&E parts and components (MATRADE, 2016). The unit of analysis is organization. Survey questionnaires are distributed to the Malaysian E&E manufacturing firms, which are randomly selected according to the systematic random sampling procedure and the minimum sample size requirement from sampling table published by Morgan and Krejcie (1970). A total of 267 returned survey questionnaires are verified complete and valid, and used for data analysis in this study.

The first research objective is "to examine the influences of product quality, trust, cooperation, and communication on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry". Responding to this research objective, this study determines that product quality and cooperation have direct influences on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry. The PLS-SEM analysis finding has tested, and supported H2 and H6, which provide evidences that the relationship between product quality and customer loyalty, and relationship between

cooperation and customer loyalty are significant. The effects of product quality and cooperation on customer loyalty are determined direct and positive.

This study determines that trust and communication do not have direct influence on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry. The PLS-SEM analysis findings have tested, and rejected H4 and H8, which indicate that trust and communication have no significant influences on customer loyalty respectively. In contrast, among the three relational elements, namely trust, cooperation, and communication, only cooperation has direct influence on customer loyalty. Thus, trust and communication have no significant influences on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

With these findings, the first research objective is achieved in this study. Product quality and cooperation have significant influences on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry. Trust and communication do not have significant influences on customer loyalty. As regards the first research question, which states "do product quality, trust, cooperation, and communication directly influence customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry?", the findings of this study have apparently provides answers to the research question. Product quality has significant influence on customer loyalty of Malaysian E&E manufacturing firms toward suppliers in Malaysian E&E manufacturing industry. Among the three relational

elements, only cooperation has significant direct influence on customer loyalty of Malaysian E&E manufacturing firms towards their suppliers in Malaysian E&E manufacturing industry. The relationship between product quality and customer loyalty, and relationship between cooperation and customer loyalty are positive and direct. The other two relational elements, namely trust and communication, have no significant influences on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

The second research objective states "to investigate the mediating effects of commitment on the relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry." It involves the mediating effects of commitment on the relationships between the four predictors, namely product quality, trust, cooperation and communication, and customer loyalty. The mediation effect analysis findings have tested and supported H10, H11, H12, and H13, which provide evidences that commitment significantly mediates all the four relationships, namely between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry. Product quality, trust, cooperation, and communication indirectly influences on customer loyalty with the mediating effects of commitment presents in the relationships. Thus, the second research objective is achieved in this study.

As regards the second research question that states "does commitment mediate the relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry?", The findings of this study have obviously answered the second research question. Commitment indeed plays significant function in mediating the relationships between product quality and customer loyalty, trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty.

5.2 Discussions

This study is primarily undertaken to investigate the influences of product quality and relational elements, namely trust, cooperation, and communication, on customer loyalty in Malaysian E&E manufacturing industry. The first approach involves the influence of product quality, which directly and indirectly (via mediating effect of commitment) on customer loyalty, and the second approach involves the direct and indirect (via mediating effects of commitment) influences of relational elements, namely trust, cooperation, and communication, on customer loyalty.

5.2.1 The Influence of Product Quality on Customer Loyalty

In response to the first objective, H2 is meant to test the influence of product quality towards customer loyalty. According to the PLS-SEM analysis finding, the relationship between product quality and customer loyalty is significant and relevant. The effect of product quality is determined positive and direct toward customer loyalty. Thus, H2 is

supported evidencing that product quality directly influences customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

The finding concurs with previous study by Cater and Cater (2010), who determined that product quality has positive impact on customer loyalty in the manufacturing industry. It means that customer loyalty can be established, when suppliers offer product quality consistently. By providing products with consistent quality, suppliers in Malaysian E&E manufacturing industry are able to keep customers loyal to the relationships with them. Malaysian E&E manufacturing firms has less business risks concerning product quality by staying loyal with the same supplier, against exposing to uncertainty by trying out alternative suppliers.

The finding of this study is logical because product offering is the core reason for Malaysian E&E manufacturing firms to engage in the relationship with suppliers in the E&E manufacturing industry. Without product quality, Malaysian E&E manufacturing firms have no motivation to stay loyal to the relationship with suppliers (Cater and Cater, 2010). Furthermore, according to social exchange theory (Horman, 1961), Malaysian E&E manufacturing firms will stay loyal to the relationship, if the benefits, specifically consistent product quality, are greater than the business risks or costs. Alternatively, the Malaysian E&E manufacturing firms may leave the relationship, when the benefits are lesser than the business risks or costs. Therefore, supplier can gain customer loyalty, and thus differentiate itself from other suppliers by offering consistent product quality to Malaysian E&E manufacturing firms.

The finding of this study is also in accordance with the study by Long et al. (2013) study, who determined that there is a meaningful relationship between product quality and customer loyalty in the manufacturing industry. Their study revealed that performance and reliability are most important elements of product quality that have positive impact on customer loyalty. In this study, the finding reveals that product quality has significant direct influence on customer loyalty too. The definition of product quality takes into consideration for consistency in conformance, in addition to performance and reliability, which are among the eight quality dimensions that Garvin (1984) pointed out for manufacturing approach to defining quality. Thus, suppliers should emphasize the consistency of these three quality dimensions, namely conformance, performance, and reliability, to gain customer loyalty in Malaysian E&E manufacturing industry.

Social exchange theory predicted the findings of this study, in which product quality has significant influence on customer loyalty of Malaysian E&E manufacturing firms toward suppliers in Malaysian E&E manufacturing industry. Product quality is considered an important value to Malaysian E&E manufacturing firm's operation considering that the Malaysian E&E manufacturing firm has difficulty to find alternative products with high standard of product quality elsewhere. Malaysian E&E manufacturing firms gain benefits from the product quality, and loyal the suppliers to secure the vital supply of products. Thus, product quality is indeed an essential form of product differentiation that affects customer loyalty positively.

5.2.2 The Influences of Relational Elements on Customer Loyalty

Responding to the first research objectives, three hypotheses are intended to test the influences of relational elements, namely trust, cooperation, and communication, on customer loyalty. Three hypotheses are H4, H6, and H8, which test the significant of relationships between the three relational elements toward customer loyalty. According to the PLS-SEM analysis findings, the relationships between trust and customer loyalty, and communication and customer loyalty are not significant. Thus, H4 and H8 are not supported indicating that there are no direct influence of trust on customer loyalty and direct influence of communication on customer loyalty. The PLS-SEM analysis findings determine that the relationship between cooperation and customer is significant. The influence of cooperation towards customer loyalty is direct and positive. Thus, H6 is supported evidencing that there is significant direct influence of cooperation on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

It is discovered in this study that the relationship between trust and customer loyalty is not significant, despite relationship marketing literatures report the direct relationship is significant in other industries. A plausible explanation comes from Wu et al. (2012), who pointed out that in high technology industries, such as E&E manufacturing industry, are characterized by fast changing technologies and products, volatile market demands, complex product structures, and short product life cycles. Although trust is important in the working relationship, however, it does not necessary influence or translate into customer loyalty due to the high uncertainties and fast changing business situations that

Malaysian E&E manufacturing firms are facing in the E&E industries. Besides, Ai-Chin, Hon-Tat, Yusoff and Rasli (2010) reported that there is high supplier dominance, from suppliers appointed by OEM, in E&E manufacturing industry. Relationship with the appointed supplier is inflexible, and Malaysian E&E manufacturing firms have no influence to shape the relationships (Cox et al., 2003). Although trust may still exist in the working relationship, however, it is unlikely Malaysian E&E manufacturing firms will foster customer loyalty towards the appointed supplier under such inflexible business conditions.

This study finds that cooperation directly influences customer loyalty in Malaysian E&E manufacturing industry. McDonnell et al. (2011) have determined similar relationship, where cooperative relationship in the franchise B2B industry can lead to customer loyalty. In addition, Yang et al. (2014) discovered that cooperation is an important predictor to customer loyalty in the B2B tourism industry. Their findings, and as well as the finding of this study, point to the essence that suppliers need to cooperate in the relationships with customers. In order to gain customer loyalty, suppliers should cooperate by investing in the relationship to be able to generate benefits for customers, who stay loyal with the relationships to continue receiving the benefits (Kim et al., 2013). Likewise, suppliers in E&E manufacturing industry can extend technical cooperation by sharing manufacturing technologies, resources, and knowledge with Malaysian E&E manufacturing firms to speed up new product development (Li, Li, & Feng, 2015). Such technical cooperation creates competitive advantage to both the suppliers and Malaysian E&E manufacturing firms in the supply chain. Moreover, the cooperative relationships

between suppliers and loyal Malaysian E&E manufacturing firms can reduce the risks associate with market volatility in the E&E industry (Wu et al., 2015). Therefore, suppliers cooperating in the relationship gain customer loyalty.

Furthermore, Wu et al. (2015) suggested that cooperation maintains the relationship that eventually foster customer loyalty. Such suggestion has merit in Malaysian E&E manufacturing industry, where cooperative relationship between suppliers and Malaysian E&E manufacturing firms can lead to customer loyalty. It is apparent that cooperation is an important relational element that positively affects customer loyalty.

Social capital theory predicted that cooperation has significant influence on customer loyalty in this study. Cooperation is considered an important social capital resource that is embedded in the relationship, in which supplier and Malaysian E&E manufacturing firm utilize to achieve mutual objectives. In similar way, supplier exploits the social capital resource, namely customer loyalty, which is embedded in the relationship. Malaysian E&E manufacturing firm and supplier have to rely more than their own capabilities to achieve challenging business objectives. They have to cooperate and complement their capabilities and resources. Supplier and Malaysian E&E manufacturing firm gain benefits from the social capital resource, namely cooperation, which is embedded in the relationship. Malaysian E&E manufacturing firm is compelled to stay in the relationship, and loyal to the supplier in order to continue receiving the benefits associate with cooperation from the supplier.

The PLS-SEM analysis finding shows that there is no significant direct relationship between communication and customer loyalty. H8 is not supported indicating that communication has no direct influence on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry This finding is contrarily to the results from previous studies, which determined that communication affects customer loyalty in other industries. A plausible explanation to the finding comes from Karr-Wisniewski and Lu (2010), who pointed out that reliance of excessive information in workplace can be counter-productive. E&E industry rely heavily on information usages, such as electronic mails, websites, electronics, portals, social media, and other electronics marketing communication channels, to share information between customers and suppliers. Due to the fast changing business environment and volatile demands in the E&E industry, excessive and frequent information is inevitably exchanged in order for customers and suppliers to keep abreast with the changes. Excessive information sharing can cause information overload that is counter-productive to customers (Hoq, 2016), and hindering efforts to foster customer loyalty.

Another plausible explanation is related to business globalization, where Malaysian E&E manufacturing firms are operating with suppliers globally. Communication is important to ensure Malaysian E&E manufacturing firms and suppliers are working effectively. However, it (communication) is unlikely to foster customer loyalty towards foreign suppliers, as Malaysian E&E manufacturing firms' preferences toward suppliers with culture similarity, and common language that enhance communication (Saleh et al., 2014).

The findings have determined that among the three relational elements, only cooperation has significant direct influence on customer loyalty, while trust and communication do not have significant direct influence on customer loyalty. Creating cooperative working relationships with Malaysian E&E manufacturing firms in the Malaysian E&E manufacturing industry are certainly essential, as cooperation can positively develop customer loyalty directly.

5.2.3 Mediating Effect of Commitment on the Relationship between Product Quality and Customer Loyalty

Responding to the second objective, the first set of hypotheses, which consist of H1, H3, and H10, are developed to test the mediation effects of commitment on the relationship between product quality and customer loyalty. H1 and H3 are pre-requisite to H10. They (H1 and H3) must be supported, in order to test H10. PLS-SEM analysis findings have determined that H1 and H3 are supported indicating that commitment has direct significant influence on customer loyalty, and product quality has direct influence on commitment respectively. Mediation effect analysis is then proceeded to test H10, and determined that commitment significant mediates the relationship between product quality and customer loyalty. H10 is supported providing evidence that product quality indirectly influences customer loyalty via mediating effect of commitment. Additionally, analysis of VAF index on the path of product quality-commitment-customer loyalty has established that the relationship between product quality and customer loyalty is partially mediated by commitment of Malaysian E&E manufacturing firms in Malaysian E&E manufacturing industry.

Review of relationship marketing literatures shows that Cater and Cater (2010) has also determined the significant mediating effect of commitment on the relationship between product quality and customer loyalty in the manufacturing industry. In this study, the relationship between product quality and customer loyalty is partially mediated by commitment, which means that product quality indirectly effects customer loyalty via the partial mediation effect of commitment. The finding has merit in Malaysian E&E manufacturing industry because Malaysian E&E manufacturing firms form positive perception towards suppliers, when they consistently value and benefit from product quality. Reasonably, such favorable perceptions lead to higher degree of value-based commitment that fosters customer loyalty towards suppliers. Therefore, in order to develop customer loyalty in Malaysian E&E manufacturing industry, suppliers can made efforts to develop value-based commitment (from customer) by providing products with superior quality consistently. Committed Malaysian E&E manufacturing firms become loyal to the relationship with suppliers, because they (Malaysian E&E manufacturing firms) are convinced that they are getting better values from the suppliers.

Marshall (2010) pointed out that negative calculative commitment is an essential form of influence in B2B industries. Negative calculative commitment is based on rational motive whether customer wants to stay or leave the relationship by considering the termination or switching costs associate with leaving the relationship (Kumar, 1996). The influence of negative calculative commitment is evidenced in this study, where commitment is found mediating the relationship between product quality and customer loyalty. In the E&E manufacturing industry, it can be costly and risky for Malaysian E&E

manufacturing firms to switch to new suppliers, because the process involves complicated and time-consuming product re-qualifications. Unless there is major business need that necessitate action to terminate the current supplier, Malaysian E&E manufacturing firms are committed and unlikely to switch the current supplier, and thus creating customer loyalty.

It is common to find Malaysian E&E manufacturing firms cooperate with suppliers to jointly develop products at the NPD stage. Malaysian E&E manufacturing firms are locked-in or negatively calculative committed to the relationship, as many efforts and resources are invested to jointly develop the new products (Lin and Huang (2013). It is difficult for them to replace its supplier or substitute the jointly-developed products after the products are qualified meeting quality standards, and approved for manufacturing and sales. As such, Malaysian E&E manufacturing firm is compelled to remain committed to the relationship, and loyal to the supplier (Molina-Castillo et al., 2011).

In the E&E manufacturing industry, product quality is considered an important element of value to Malaysian E&E manufacturing firm. Products with consistent and superior quality increase the Malaysian E&E manufacturing firm's operation efficiency, and thus, enabling them to deliver final products to market ahead of competition. Furthermore, product quality enables Malaysian E&E manufacturing firms to reduce operation costs by eliminating inspections for incoming shipments of products, and in-process quality control inspections. According to the social exchange theory, Malaysian E&E manufacturing firms evaluate the cost and benefit continuously to decide the worth of the

relationships. Commitment is expected to develop within the relationship when the Malaysian E&E manufacturing firms benefit from the values associate with product quality. As the committed Malaysian E&E manufacturing firms interact over time, they experience the need to reciprocate the values associate with product quality that are received from supplier in the form of customer loyalty.

Therefore, this finding has achieved the first part of the second research objective and provided answer to the first part of the second research question, of which each have four parts related to indirect effect (via mediating effects of commitment) of product quality, trust, cooperation, and communication on customer loyalty. This study establishes that product quality indirectly influences customer loyalty through the mediating effect of commitment. Commitment indeed plays crucial role in mediating the influence of product quality on customer loyalty of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

5.2.4 The Mediating Effects of Commitment on the Relationships between Relational Elements (e.g. Trust, Cooperation, and Communication) and Customer Loyalty

Pursuing on the remaining three parts of the second objective, three sets of hypotheses are involved to test the mediation effects of commitment between relational elements, namely trust, cooperation and communication, and customer loyalty. The first set of hypotheses involves H1, H5, and H11, where H1 and H5 are pre-requisites before H11 can be tested to determine the mediation effect of commitment on the relationship

between trust and customer loyalty. The second set of hypotheses consists of H1, H7, and H12. Similarly, H1 and H7 must be supported, before H12 can be tested to determine the mediation effect of commitment on the relationship between cooperation and customer loyalty. The third set of hypotheses contains H1, H9, and H13. H1 and H9 are pre-requisites before testing of H13 can begin to determine the existence of mediation effect of commitment on the relationship communication and customer loyalty. Additionally, analysis of VAF index are used to analyze the type of mediation effect of commitment in the relationships between trust and customer loyalty, cooperation and customer loyalty, and communication and customer loyalty respectively.

On the first set of hypotheses, which consists of H1, H5, and H11, the PLS-SEM analysis findings have determined that H1 and H5 are supported indicating that commitment has significant direct influence on customer loyalty, and trust has significant direct influence on commitment respectively. The mediation effect analysis proceeds to test H11, and determines that it is supported. Analysis of VAF index on path trust-commitment-customer loyalty has established that the relationship between trust and customer loyalty is fully mediated by commitment of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

The finding concurs with previous studies by Hsu et al. (2013) and Amani (2015), who determined that commitment mediates the relationship between trust and customer loyalty. Similarly, this study finds that commitment plays important mediating role in the relationship between trust and customer loyalty in Malaysian E&E manufacturing

industry. Essentially, trust is important in the working relationship because it leads to high degree of commitment, which in turn influences customer loyalty (Hsu et al., 2013; Moorman et al, 1992; Morgan and Hunt, 1994). The relationships are also evident in the management of specific asset investment, which is commonly found in the E&E manufacturing industry. Although the specific asset investment creates benefits to E&E manufacturing firms, it can subject to opportunism unless high degree of trust and commitment exist in the relationship (Chen et al., 2011). With trust established in the relationship, it (trust) helps in joint-decision making, and problem solving, while commitment enables customer and supplier to contribute efforts and resources towards mutual benefits. Customer loyalty is eventually developed, and opportunism is effective restrained in the relationship.

The finding by Wu et al. (2015) is also substantiated by this study, where high degree of trust is necessary to gain customer commitment in industry. With the presence of trust, both supplier and Malaysian E&E manufacturing firm have higher intention to commit to the relationship, and willing to take more business risks. This trust-commitment relationship leads to customer loyalty, which is important to the competitive advantage of supply chain in Malaysian E&E manufacturing industry.

For the second set of hypotheses consisting of H1, H7, and H12, the PLS-SEM analysis finding determines H1 and H7 are supported. The relationship between commitment and customer loyalty is significant implying commitment has direct influence on customer loyalty, while the relationship between cooperation and commitment is significant

implying that cooperation has direct effect on commitment as well. Based on the mediation effect analysis testing, H12 is supported evidencing that commitment mediates the relationship between communication and customer loyalty. Analysis of VAF index on path cooperation-commitment-customer loyalty has established that the relationship between cooperation and customer loyalty is partially mediated by commitment of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

The finding is in accordance with the study by Cater and Cater (2010), who determined that commitment plays important mediating function between cooperation and customer loyalty. An appropriate explanation comes from Wilson (1995), who described that cooperation between customer and supplier in the E&E industry supply chain is a source of values. Both customer and supplier engage in cooperative behaviors in order to continue the relationship that is mutually beneficial. Commitment is higher, when both customer and supplier involves in the cooperative relationship to improve business processes, and thereby create values for themselves. Customer is motivated to stay committed, and incline to foster customer loyalty in the relationship, as the cooperation create benefits that are essential to competitive advantage for customer and supplier in this E&E industry supply chain.

Furthermore, finding of this study concurs with Graca et al. (2015) that cooperation has positive influence on commitment. Cooperating suppliers and Malaysian E&E manufacturing firms are inclined to reciprocal behaviors after they have made

commitment on resources to the relationship. Reciprocal behaviors include securing investment, resources, technologies, problem resolutions, and access to critical information can improve perceptions of relationship cooperativeness, which are essential to develop customer loyalty in the E&E manufacturing industry. Thus, suppliers in Malaysian E&E manufacturing industry develop customer loyalty by creating cooperative working relationship to gain commitment from Malaysian E&E manufacturing firms. The cooperative working relationships form reciprocal behaviors that are mutually beneficial to both supplier and Malaysian E&E manufacturing firms. Such cooperative business approach encourages the committed Malaysian E&E manufacturing firms to develop loyalty towards the suppliers.

The third set of hypotheses involves H1, H9 and H13. The PLS-SEM analysis finding confirms that H1, and H9 are supported. The findings indicate that commitment has significant direct effect on customer loyalty, and communication has significant direct effect on customer loyalty. With both H1 and H9 are supported, mediation effect analysis is conducted to test H13, and determines that it (H13) is also supported. This finding has determined that commitment mediates the relationship between communication and customer loyalty. Analysis of VAF index on path communication-commitment-customer loyalty has established that the relationship between communication and customer loyalty is fully mediated by commitment of Malaysian E&E manufacturing firms toward their suppliers in Malaysian E&E manufacturing industry.

The findings concur with Human and Naude (2014), who determined that commitment

mediates the relationship between communication and customer loyalty in the computer aided industry. Commitment indeed plays essential role in the development of relationship between communication and customer loyalty. In the same context, commitment can be adopted to develop successful relationship and differentiate against competitors in Malaysian E&E manufacturing industry. Suppliers in the committed relationships gain greater access to market information, which enable them to serve customers better. Likewise, Malaysian E&E manufacturing firms in the committed relationship receive updated information about the supply availability, capacity, lead time, product offerings, payment terms, and pricing. Since both parties gain from the committed relationships, they have stronger motivation to be loyal to each others, and are unlikely to leave the relationship. Furthermore, as Malaysian E&E manufacturing firm becomes familiar with supplier and its communication approach, they (Malaysian E&E manufacturing firms) feel more comfortable, and as a result have more reasons to remain loyal in the relationships (Human et al., 2014; Lee et al., 2013).

In addition, information overload can be avoidable in Malaysian E&E manufacturing industry, as pointed out by Hoq (2014), when Malaysian E&E manufacturing firm and supplier are committed to work together by determining the extent of information needed, approaches to access the information effectively and efficiently, and good understanding of the economic, legal, and social issues surrounding the use of information. Such commitment creates enormous benefits to both Malaysian E&E manufacturing firm and supplier, and hence more compelling reason for them to remain loyal to each other.

Thus, these findings have achieved the remaining three parts of the second research objectives, and as well as provided answers to the remaining three parts of the second research question. All three relational elements, namely trust, cooperation, and communication, have significant indirect influences on customer loyalty via the mediating effects of commitment in Malaysian E&E manufacturing industry. The relationships between trust and customer loyalty, and communication and customer loyalty are fully mediated by commitment respectively. The relationship between cooperation and customer loyalty is partially mediated by commitment. It has verified that commitment plays key mediating role in relationship marketing (Morgan and Hunt, 1994).

The findings of this study are expected, according to social capital theory, since trust, cooperation, and communication are important social capital resources in Malaysian E&E manufacturing industry. Suppliers possessing high degree of trust, cooperation, and communication offer values to Malaysian E&E manufacturing firms to achieve challenging business objectives. The interactions between Malaysian E&E manufacturing firms and suppliers establish patterns of expectation base on norms of reciprocity and equity (Gordon & Cheah, 2014). Accordingly, reciprocating on the supports for social capital resources, Malaysian E&E manufacturing firms act in the way of commitment to their suppliers. Hence, suppliers can exploit the resources, namely commitment, embedded in the relationship with Malaysian E&E manufacturing firms. As the relationship with suppliers grow closer, committed Malaysian E&E manufacturing firms become loyal to the suppliers so as to continue receiving benefits from these social capital resources, namely trust, cooperation, and communication, from the suppliers.

5.2.5 Complementary Effects of Product Quality, and Relational Elements (e.g. Trust, Cooperation, and Communication) toward Customer Loyalty

In essence, the concept of this study is based on two approaches, namely product differentiation and relationship marketing, to influence customer loyalty in Malaysian E&E manufacturing industry. The first approach involves the influence of product quality, which is an essential form of product differentiation, toward customer loyalty. The second approach is related to the influences of trust, cooperation and communication, which are prominent relational elements of relationship marketing, on customer loyalty. Findings of this study have determined that the two approaches can complementary influence customer loyalty in Malaysian E&E manufacturing industry.

The first approach demonstrates that product quality can influence customer loyalty directly, and as well as indirectly via the mediating effect of commitment. In this study, the finding has determined that the relationship between product quality and customer loyalty is significant. It signifies that product quality can directly influences customer loyalty in the Malaysian E&E manufacturing industry. The finding also determines that the relationship between product quality and customer loyalty is significantly mediated by commitment. It indicates that product quality can indirectly influence on customer loyalty with the partial mediation effect of commitment. Therefore, product quality can influence customer loyalty both ways, specifically directly and indirectly via the presence of partial mediation effect of commitment. Both the direct and indirect (via the mediating effect of commitment) influences of product quality on customer loyalty establish the existence of the first approach in the Malaysian E&E manufacturing industry.

The second approach is related to relationship marketing, where prominent relational elements, namely trust, cooperation, and communication, exhibit influences on customer loyalty. Similar to the first approach, it involves the direct influences toward customer loyalty, and the indirect influences toward customer loyalty via the mediating effects of commitment. In this study, it is determined that only cooperation has significant direct influence on customer loyalty, while trust and communication have no direct influences on customer loyalty respectively. With regards to the indirect influences toward customer loyalty, trust indirectly influences customer loyalty with the presence of full mediation effect of commitment. Similar effect occurs on the influence of communication toward customer loyalty, where communication indirectly influences customer loyalty with the presence of full mediation effect of commitment. Cooperation indirectly influences customer loyalty differently. It indirectly influences customer loyalty with the presence of partial mediation effect of commitment. These findings establish the presence of second approach in the Malaysian E&E manufacturing industry.

These two complementary approaches are important in Malaysian E&E manufacturing industry considering the competitive nature of business. Suppliers in Malaysian E&E manufacturing industry can simultaneously apply both approaches to influence customer loyalty in Malaysian E&E manufacturing industry. As pointed out by Cater and Cater (2010) that, in recent years, it is not sufficient to rely on the basis of product quality alone to differentiate from the competition in the manufacturing industry. Suppliers have to develop long term relationships with Malaysian E&E manufacturing firms to complement the product offerings.

Relationship marketing is important because it can bind Malaysian E&E manufacturing firms and suppliers to work together, in such as a way that they can gain values beyond the mere exchange of products. The second approach becomes even more important, when it complements the first approach involving the influence of product quality to influence customer loyalty effectively.

5.3 Contributions and Implications

The findings of this study with regards the effects of product quality, and relational elements, namely trust, cooperation, and communication, of relationship marketing on customer loyalty provide profound implications to the competitive advantage in Malaysian E&E manufacturing industry. The implications are categorized into two groups. The first group concerns about theoretical contributions, and the second group is related to managerial contributions.

5.3.1 Theoretical Contributions

The empirical findings of this study show that product quality affects customer loyalty both directly and indirectly. Product quality influences customer loyalty directly, and it also indirectly influence product quality towards customer loyalty via the partial mediation effect of commitment. On the hand, relational elements influence customer loyalty differently. Among the three relational elements, only cooperation influences customer loyalty directly. The other two relational elements, namely trust and communication, do not have effects on customer loyalty directly. Nevertheless, with the presence of mediation effect of commitment, all three relational elements influence

customer loyalty indirectly. The relationship between cooperation and customer loyalty is partially mediated by commitment, while the relationships between relational elements (trust and communication), and customer loyalty are fully mediated by commitment. The empirical findings of this study add important knowledge to the extant relationship marketing literatures. They (empirical findings) shed important insights on how product quality and relationship marketing via relational elements of trust, cooperation and communication influence customer loyalty in Malaysian E&E manufacturing industry.

This study determines that product quality influences customer loyalty in two ways. The first way involves the direct influence of product quality on customer loyalty, while the second way is related to indirect influence of product quality on customer loyalty via mediation effect of commitment. Empirical findings of this study confirm that the relationship between product quality and customer loyalty is partially mediated by commitment. It means that product quality influences customer loyalty directly and indirectly with the presence of commitment acting as mediator. Relationship marketing literatures have adequately studied the direct influence of product quality towards customer loyalty, but there is still lacking attention on the indirect influence of product quality towards customer loyalty in Malaysian E&E manufacturing industry context. This study has provided important theoretical insight into the indirect effects of product quality toward customer loyalty by incorporating the mediating role of commitment.

In addition, the current relationship marketing literatures tend to analyze the three variables in the form of dyadic linkages, such as product quality–commitment, product

quality-customer loyalty, and commitment-customer loyalty. There are limited studies to examine all these three variables in a single linkage in research framework (Cater & Cater, 2010). Thus, this study adds knowledge to the extant relationship marketing literatures by examining and confirming the relationship between the three variables in a single relationship linkage. The empirical findings of this study determine that the relationship product quality and customer loyalty is partially mediate by commitment.

This study has determined that the relationship between trust and customer loyalty is fully mediated by commitment. Interestingly, trust does not have direct influence on customer loyalty in Malaysian E&E manufacturing industry. Trust can only influence customer loyalty with the presence of mediation effect of commitment. The finding of this study is in accordance with the study by Tsai (2011), who determined that commitment and trust do not juxtapose to create mediation effects on relationships. Commitment appears as key mediating variable leading to customer loyalty, and the effect of trust on customer loyalty is fully mediated by commitment. The findings of this study provide new knowledge in relationship marketing studies with respect to the variation from key mediating variable concept introduced by Morgan and Hunt (1994), who proposed that commitment and trust juxtapose to exercise mediation effects on relationships.

The research framework of this study advances the proposition that cooperation influences customer loyalty in two ways. The first way involves the direct influence of cooperation towards customer loyalty. The second way focuses on the indirect influence

of cooperation towards customer loyalty via the mediation effect of commitment. Relationship marketing studies on the indirect relationship between cooperation and customer loyalty via commitment is scarce in the B2B manufacturing context. This is due to the fact that there is limited relationship marketing studies focus on the proposition, where cooperation is conceptualized as the antecedent of commitment (Payan & Svensson, 2007; Mavondo & Rodrigo, 2001). This study has confirmed that the indirect relationship is significant in Malaysian E&E manufacturing industry. Thus, the empirical finding is considered as significant contribution to the body of knowledge of relationship marketing, particularly in the E&E manufacturing industry context.

The casual orientation between communication and commitment varies in relationship marketing studies. Brianchi and Saleh (2011), Fawcett et al. (2012), Park et al. (2012), and Saleh et al. (2014) reported that communication is an antecedent of commitment, while Abdullah and Musa (2014), Meek, Davis-Sramek, Braucus and Germain (2011), and Zeffane et al. (2011) argued that communication is a consequent of commitment. This study adopts the proposition that communication is an antecedent of commitment. It contends with the justification from Theron, Terblanche and Boshoff (2008), and Goodman and Dion (2001) that a B2B relationship is characterized by effective communication should enhance commitment to the relationship.

By doing so, the study verifies the indirect effect of communication on customer loyalty via the relationship linkage of communication-commitment-customer loyalty. The finding of this study confirms that the relationship between communication and customer

loyalty is fully mediated by commitment. It means that communication affects on commitment, and through it (commitment) influences customer loyalty. The casual orientation between communication and commitment is confirmed in this study, in which communication acts as an antecedent of commitment. Therefore, this study adds to the stream of relationship marketing literatures that adopt the causal orientation where communication acts as an antecedent to commitment.

5.3.2 Managerial Contributions

Aside from the theoretical contributions, managers in supplier firms can use the empirical findings as learning material, which helps them to improve relationships with Malaysian E&E manufacturing firms. Generally, suppliers can gain new insight from the research framework, and empirical findings about the relationships between predictors (product quality, trust, communication, and cooperation) and customer loyalty, and the mediating effects of commitment on the respective relationships. More specifically, managers in the supplier firms can assess current relationships, and as well as developing new relationships with Malaysian E&E manufacturing firms by adopting and applying two complementary approaches, which has been developed in this study, to influence customer loyalty simultaneously. The two complementary approaches involve product quality, and relational elements, namely trust, cooperation, and communication, to influence customer loyalty.

In E&E manufacturing businesses, products are important, and must first exist so that business relationships can build around them (products). Malaysian E&E manufacturing

firm has no desire to develop or continue the relationship merely for the relationship itself, unless it receives products that meet specifications and expectations. The finding of this study, namely the significant influence of product quality on customer loyalty, has important managerial implication for managers in supplier firms to emphasize consistent quality in manufacturing products because product quality can develop customer loyalty directly. Suppliers are recommended to undertake quality initiatives, such as ISO9001 standards for quality management system, Kaizen practices for continuous product quality improvement, Six Sigma methodology to improve consistency of product quality, Total Quality Management, to manage product quality effectively in the manufacturing processes. Products with consistent and superior quality are beneficially to both suppliers', and Malaysian E&E manufacturing firms' operations. Malaysian E&E manufacturing firms are loyal to the suppliers, when they experiences that they are getting values from the products with consistent and superior quality. Additionally, loyal Malaysian E&E manufacturing firms may advocate the products to potential customers, which generate more business opportunities, and increase the supplier's reputation for manufacturing and supplying products with high standard of quality.

As established in this study, there is another equally important managerial implication for suppliers to develop or establish customer loyalty with product quality. Managers in the supplier firms are suggested to gain commitment from Malaysian E&E manufacturing firms with the influence of product quality. By supplying products with superior quality, Malaysian E&E manufacturing firms can be locked-in or negatively calculative committed to the relationships with suppliers, as they (Malaysian E&E manufacturing

firms) may have difficulties to find products with similar high standard of quality from elsewhere in the market. It is important for supplier to invest on manufacturing technologies to increase technical capabilities to develop new products with superior quality. New products that are jointly developed between Malaysian E&E manufacturing firms and suppliers can lock-in (calculative commitment) the Malaysian E&E manufacturing firms into the relationship with supplier. It is difficult for Malaysian E&E manufacturing firms to find substitutes with similar level of product quality elsewhere. The committed Malaysian E&E manufacturing firms are loyal to the relationship, so that they can secure continuous supply of the products for their operations.

Malaysian E&E industry is a very competitive, where suppliers continuously make efforts to out-do each others. Due to this nature of aggressive competition, it is becoming ever more difficult for the supplier to differentiate itself from competition solely on the basis of product offerings. Although product differentiation is still important, the marketing emphasis is gradually shifting towards developing unique relationship with Malaysian E&E manufacturing firms, where the relationships are not easily or cannot be imitated by competitors. The findings of this study have managerial implication for managers in the supplier firms with regards to managing marketing emphasis shift in the E&E manufacturing industry. Managers in the supplier firms should manage the marketing emphasis shift efficiently via the two complementary approaches, which involve the influences of product quality, and relational elements (trust, cooperation, and communication) to influence customer loyalty, in Malaysian E&E manufacturing industry.

When applying the complementary approach, which involves the influences of relational elements (trust, cooperation, and communication) on customer loyalty, managers in supplier firms should take cautions, because not all the relational elements influence customer loyalty in the same ways. As established in this study, only cooperation can influence customer loyalty both directly and indirectly (with the partial mediating effect of commitment). In contrast, trust and communication have no effect on customer loyalty directly. They can only influence customer loyalty with the presence of full mediation effect of commitment. The findings of this study have managerial implications for managers in supplier firms, who are seeking better understanding of commitment and customer loyalty from immediate Malaysian E&E manufacturing firms in the Malaysian E&E material sourcing industry. Managers in the supplier firms are recommended to adopt the influences of relational elements, and in addition to product quality, wisely to maximize their efforts in establishing commitment and customer loyalty with Malaysian E&E manufacturing firms, in order to secure allocation of resources, and willingness to recommend products to end customers and foreign subsidiaries.

As established in this study, the dependency of commitment on trust suggests managers in supplier firms should act in ways that are trustworthy and capable as perceive by the Malaysian E&E manufacturing firms. The finding of this study has managerial implication for manager in supplier firms to avoid focusing on gaining customer loyalty directly, rather to put efforts to develop commitment from the Malaysian E&E manufacturing firms. In the E&E manufacturing industry, it is not uncommon to find suppliers manufacture and provide similar products to several competing Malaysian E&E

manufacturing firms. In this situation, it is reasonable to expect that trust cannot influence customer loyalty directly. Instead, it is recommended that suppliers to pay more attention, and invest as many efforts to develop trust with Malaysian E&E manufacturing firms. For instance, they should act with trustworthy, credibility and integrity, when reporting manufacturing problems or potential risks to Malaysian E&E manufacturing firms, and demonstrate capability and competency to resolve the manufacturing problems in timely manner. When the Malaysian E&E manufacturing firms correctly perceive that elements of trust, such integrity, trustworthy, credibility, competency, and reliable, are present with the supplier, a very high chance exists that they (Malaysian E&E manufacturing firms) are committed, and become loyal to the supplier, as is indicated by the finding of this study, and similarly pointed out by Koniewski (2012).

In the technology industry, which includes Malaysian E&E manufacturing industry, cooperative relationship is very important to both Malaysian E&E manufacturing firms and suppliers. Due to the rapid changing technologies and business demands in the E&E industry, Malaysian E&E manufacturing firms have to rely more on their own capabilities to develop new products, market and technologies. They have to cooperate with suppliers to complement their capabilities. As such, the findings of this study, which are the significant direct influence of cooperation on customer loyalty, and the significant indirect influence of cooperation on customer loyalty via the mediating effect of commitment, have important managerial implications for managers in supplier firms to extend cooperation, such as sharing critical information about manufacturing technologies, and scientific data of product characteristics, to Malaysian E&E

manufacturing firms for products, and business developments. In addition, managers in supplier firms should cooperate by pledging and allocating sufficient technical expertise and managerial staffs to work together with teams from Malaysian E&E manufacturing firms, as their (suppliers) cooperative efforts will be reciprocated with commitment and customer loyalty from the Malaysian E&E manufacturing firms.

Managers in supplier firms are cautioned against assuming that communication affects customer loyalty directly. Contrarily, this study determines that communication does not have direct influence on customer loyalty. Communication can only indirectly affect customer loyalty with the present of full mediation effect of commitment. Thus, the finding has important managerial implication for managers in supplier firms to avoid offering excessive information with the intention to seek customer loyalty directly, instead they should strategically develop communication system with intention to gain commitment from Malaysian E&E manufacturing firms. For instance, web-based supplier portal system contain critical information, such as shipment deliveries, product information and updates, product quality data, payment terms, and pricings, that are important to the Malaysian E&E manufacturing firms' operations. When the Malaysian E&E manufacturing firms are familiar and pre-occupied with the web-based supplier portal system for frequent updates, they (Malaysian E&E manufacturing firms) are compelled to stay committed to relationship, and become loyal to the suppliers.

In addition, the findings of this study has managerial implication for suppliers to adopt communication approach as a two ways process, where it seeks vital information,

specifically marketing information, product trends, and future development, to better serve Malaysian E&E manufacturing firms. It should also share important manufacturing information, such as manufacturing technology, payment term, production capacity, and production lead-time, to assist Malaysian E&E manufacturing firms make better decisions. Due to suppliers and Malaysian E&E manufacturing firms receive benefits from the two ways communication, both of them have stronger motivation to nurture and maintain the relationship through committed efforts (Human & Naude, 2014). And as the committed Malaysian E&E manufacturing firms feel more at ease with the supplier's communication approach, they have more reasons to be loyal to the relationship with the suppliers.

5.4 Limitations of Study

This study has several notable limitations that should be considered for future studies exploring the same field. Firstly, this study adopts a cross-sectional approach, where it is carried out at one point of time. This short period of time may not sufficient to observe the actual ways in which Malaysian E&E manufacturing firms manage their suppliers. It is suggested to consider longitudinal study, where data is collected over longer period of time to observe the changes of characteristics in the variables. The longitude study has its own advantage in examining linkages between variables and their interactions over longer period of time, which takes into consideration the changing environment that may have happened in Malaysian E&E manufacturing industry.

This study may be limited by the sampling frame, where samples of Malaysian E&E

manufacturing firms are randomly drawn from two directories, namely FMM Industry Directory (FMM, 2016), and MATRADE directory for computer hardware, consumer and industrial E&E products, telecommunication, and E&E parts and component (MATRADE, 2016). However, not all E&E manufacturing firms in Malaysia are registered in these two directories. In addition, this study comes across inaccurate data or outdated information of Malaysian E&E manufacturing firms in both directories. Survey questionnaires are consequently sent to the outdated or wrong addresses. It is recommended that future studies should enlarge the sample frame, where representative samples can be randomly taken from more directories.

In this study, the relationship marketing approach is confined to three prominent relational elements, namely trusts, cooperation, and communication. Other relevant relational elements may exist, and have influences on commitment and customer loyalty. It is suggested that future research to enrich this study by examining additional relational elements that may have impacts on commitment and customer loyalty. For instance, relational elements representing social dimension, such as independency, share value, and cultural similarity, are suggested for future research.

This study adopts the global construct for customer loyalty, which is based on the composite definition of customer loyalty. It takes into account of aspects of behavioral and attitudinal characteristics of customer loyalty in the single construct. Future studies are suggested to expand this study by adopting two distinct constructs for customer loyalty. The two constructs are behavioral loyalty, and attitudinal loyalty. Behavioral

loyalty is related to repetition of purchases, and attitudinal loyalty concerns about psychological attachments and attitudinal advocacy towards the product or organization. The suggested studies can lead to richer knowledge about the influences of product quality, and relational elements, namely trust, cooperation, and communication, on attitudinal loyalty and behavioral loyalty, and the mediation effects of commitment on the respective relationships.

Finally, this study has established the significant role of commitment in mediating relationships in Malaysian E&E manufacturing industry. Commitment is conceptualized as a global construct in this study. With the developments in recent years, relationship marketing studies have identified four types of commitment, namely affective commitment, positive calculative commitment, negative calculative commitment, and normative commitment (Sharma & Irving, 2005). It is suggested for future studies to expand this study by including the mediation effects of these four types of commitment on the four relationships, namely product quality-customer loyalty, trust-customer loyalty, cooperation-customer loyalty, and communication-customer loyalty, in Malaysian E&E manufacturing industry.

5.5 Conclusion

Although the E&E industry remains the largest manufacturing industry in Malaysia, it is facing difficult challenges to revert declining exports trend, and to catch-up trajectory growth with its regional peers (Bank Negara Malaysia, 2015). Malaysian E&E manufacturing industry is hard-pressed to seek ways to gain competitive advantage.

Relationship marketing and product differentiation approaches are viable options. Both approaches can be complementary to influence customer loyalty, which is the cornerstone for competitive advantage. In this study, these two complementary approaches are examined with reference to their influences on customer loyalty in Malaysian E&E manufacturing industry.

Product quality is an essential form of product differentiation. It is adopted in this study to represent product differentiation approach. Its effect is investigated with reference to the direct influence on customer loyalty and the indirect influence (with the presence of mediation effect of commitment) on customer loyalty. Trust, cooperation, and communication are prominent relational elements of relationship marketing. They are adopted in this study to represent relationship marketing approach. Similarly as product quality, their effects are investigated with reference to the direct and indirect (with the presence of mediation effect of commitment) effects on customer loyalty.

The findings of this study have determined that the relationship between product quality and customer loyalty is significant and relevant. It is concluded that product quality influences customer loyalty directly. With the presence of partial mediation effect of commitment, product quality also influences customer loyalty indirectly. Therefore, product quality, which is an essential aspect of product differentiation, has significant influences on customer loyalty directly and indirectly (with the presence mediation effect of commitment) in Malaysian E&E manufacturing industry.

The findings of this study have determined that the influences of relational elements on customer loyalty have produced various outcomes. Trust and communication do not have direct influences on customer loyalty. Relationship between trust and customer loyalty, and relationship between communication and customer loyalty become significant when the full mediation effects of commitment are present. In contrast, cooperation has direct influence on customer loyalty. Cooperation has indirect influence on customer loyalty as well (via partial mediation effect of commitment). Therefore, trust, cooperation, and communication are significant relational elements of relationship marketing approach, in which trust and communication influence customer loyalty differently from cooperation in Malaysian E&E manufacturing industry.

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APPENDIX A

Official Letter

A survey on Customer Loyalty and the Effects of Commitment towards Suppliers in Malaysian Electrical and Electronics Manufacturing Industry

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Dear sir/madam,

I am currently conducting a survey on customer loyalty as part of the doctoral research study. The objective is to investigate customer loyalty and the effects of commitment towards suppliers in Malaysian electrical and electronics manufacturing industry. Through your participation in this survey, I hope to determine how best customer loyalty can be achieved in the Malaysian electrical and electronics manufacturing industry.

Enclosed is the survey questionnaire that asks a variety of questions concerning customer loyalty. It takes 10 to 15 minutes to complete, and should be answered by only one of the following personnel, namely General Manager, Factory Manager, Purchasing Manager, Sourcing Manager, Supply Chain Manager, Supplier Quality Manager, Material Manager, or senior staffs, who have decision making capacity in supplier management. You don't need to disclose your name or your firm name, as all the inputs are treated STRICTLY CONFIDENTIAL, and will be used for academic purposes only.

If you have any questions or concerns about completing the questionnaires, you can reach me at the mobile and email contacts below. I appreciate that you complete the survey questionnaire, and return it with the enclosed self-addressed envelope or send a scanned copy to the below email address. Your cooperation in the survey is very much appreciated, and I would like thank you for the valuable efforts. Thank you.

Yours sincerely,

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APPENDIX B

Survey Questionnaire

SECTION A:

With reference to your firm background and demographic information, please tick (X) or highlight the most appropriate (only one) answer.

1. Your firm's E&E sub-sector?

- ☐ Electronic components (manufacturing of semiconductors, active & passive components, printed circuit boards, media, substrates, connectors, precision plastics, metal stamping, etc.)
- ☐ Industrial electronics (manufacturing of multimedia & information technology products, such as computers & computer peripherals, telecommunications equipment, office equipment, etc)
- ☐ Consumer electronics (manufacturing of audio visual products such as LED television receivers, bluray disc players/recorders, portable multimedia players (PMP), speakers, cameras, electronic games, etc.)
- ☐ Electrical products (manufacturing of panels and consoles, switching apparatus, lamps, air conditioners, refrigerators, vacuum cleaners, ovens, transformers, cables & wires, primary cells & batteries, solar cells, modules, etc.)

2. Total employees

- ☐ Less than 50
- ☐ 50 to 150
- ☐ 151 to 500
- ☐ 501 to 1000
- ☐ More than 1000

3. Years of operation.

- ☐ Less than 3 years
- ☐ Between 3 to 5 years
- ☐ Between 6 to 10 years
- ☐ Between 11 to 15 years
- ☐ More than 15 years

4. Annual sales turnover (year 2016).

- ☐ Less than RM10 million
- ☐ Between RM10 to RM25 million
- ☐ Between RM26 to RM50 million
- ☐ More than RM50 million

5. Type of Ownership

- ☐ Fully local (100%)
- ☐ Fully foreign (100%)
- ☐ Local (51% to 99%)
- ☐ Foreign (51% to 99%)
- ☐ Local-Foreign (50%-50%)

6. Your position in this firm.

- ☐ General Manager or Factory Manager
- ☐ Manager
- ☐ Senior Staff

7. Your tenure in this firm.

- ☐ Less than 5 years
- ☐ Between 5 to 10 years
- ☐ Between 11 to 15 years
- ☐ More than 15 years

8. Your education level (highest).

☐	Certificate/Diploma
☐	First Degree
☐	Postgraduate Degree
☐	Professional Certification

9. Your age.

☐	Below 30 years
☐	Between 30 to 40 years
☐	Between 41 to 50 years
☐	Above 50 years

SECTION B:

By comparing the preferred supplier against other suppliers, please tick (X) or highlight the most appropriate (only one) answer with reference to your firm's supplier management.

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

CL1	We consider the preferred supplier the first choice to buy parts that we need.	1	2	3	4	5	6	7
CL2	We intend to repurchase from the preferred supplier in the next few years.	1	2	3	4	5	6	7
CL3	We encourage colleagues, friends and/or customers to do business with the preferred supplier.	1	2	3	4	5	6	7
CL4	We say positive things about the preferred supplier.	1	2	3	4	5	6	7
CL5	We would definitely recommend the preferred supplier to someone who seeks our advice.	1	2	3	4	5	6	7
PQ1	The preferred supplier provides us with better product quality.	1	2	3	4	5	6	7
PQ2	The preferred supplier's product meets our quality standards better.	1	2	3	4	5	6	7
PQ3	The preferred supplier's product is more reliable.	1	2	3	4	5	6	7
PQ4	We have less product rejection from the preferred supplier.	1	2	3	4	5	6	7
PQ5	The preferred supplier provides us with more consistent product quality over time.	1	2	3	4	5	6	7

PQ6	We encounter less variation in product quality with the preferred supplier.	1	2	3	4	5	6	7
TR1	When making important decisions, the preferred supplier is concerned with our welfare.	1	2	3	4	5	6	7
TR2	When we share our problem with the preferred supplier, we know that it will respond with understanding.	1	2	3	4	5	6	7
TR3	Even when the preferred supplier gives us a rather unlikely explanation, we are confident that they are telling the truth.	1	2	3	4	5	6	7
TR4	The preferred supplier usually keeps promises that it makes to us.	1	2	3	4	5	6	7
TR5	The preferred supplier has often provided us with information that has later proven to be accurate.	1	2	3	4	5	6	7
TR6	Whenever the preferred supplier gives us advises on our business operations, we know that they are sharing their best judgment.	1	2	3	4	5	6	7
TR7	Though circumstances change, we believe the preferred supplier will be ready and willing to offer us assistance and support.	1	2	3	4	5	6	7
TR8	We can count on the preferred supplier to be sincere.	1	2	3	4	5	6	7
TR9	When it comes to things that are important to us, we can depend on the preferred supplier's support.	1	2	3	4	5	6	7
TR10	In the future, we can count on the preferred supplier to consider how its decisions and actions will affect us.	1	2	3	4	5	6	7
CO1	No matter who is at fault, problems are joint responsibilities.	1	2	3	4	5	6	7
CO2	Both parties (preferred supplier and us) are concerned about each other's profitability.	1	2	3	4	5	6	7
CO3	One party (preferred supplier or us) will not take advantage of a strong bargaining position.	1	2	3	4	5	6	7
CO4	Both parties (preferred supplier and us) are willing to make cooperative changes.	1	2	3	4	5	6	7
CO5	Both parties (preferred supplier and us) must work together to be successful.	1	2	3	4	5	6	7
CO6	Both parties (preferred supplier and us) do not mind owing each other favors.	1	2	3	4	5	6	7

CN1	In this relationship, it is expected that any information that might help us will be provided to us by the preferred supplier.	1	2	3	4	5	6	7
CN2	Exchange of information in this relationship with the preferred supplier takes place informally, and not only according to the specified agreement.	1	2	3	4	5	6	7
CN3	It is expected the preferred supplier will provide proprietary information if it can help us.	1	2	3	4	5	6	7
CN4	It is expected that the preferred supplier keep us informed about major events or changes that affect us.	1	2	3	4	5	6	7
CN5	The communication effort between the preferred supplier and our firm involves many inter-firm personnel.	1	2	3	4	5	6	7
CN6	Exchange of information in this relationship takes place in timely manner.	1	2	3	4	5	6	7
CM1	The relationship with the preferred supplier is something to which we are very committed.	1	2	3	4	5	6	7
CM2	The relationship with the preferred supplier is very important to our business.	1	2	3	4	5	6	7
CM3	The relationship with the preferred supplier is something our firm intends to maintain for long time.	1	2	3	4	5	6	7
CM4	The relationship with the preferred supplier is very much like being our firm.	1	2	3	4	5	6	7
CM5	The relationship with the preferred supplier is something our business really cares about.	1	2	3	4	5	6	7
CM6	The relationship with the main supplier deserves our business' maximum effort to maintain.	1	2	3	4	5	6	7

Thank you for your cooperation.

Note:

Please return the completed survey questionnaire with the self-addressed envelope, or send a scanned copy of completed survey questionnaire to scleong1@gmail.com

APPENDIX C1

Analysis Results for Cronbach's Alpha (Customer Loyalty)

```
RELIABILITY
  /VARIABLES=CL1 CL2 CL3 CL4 CL5
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=MEANS COV CORR.
```

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.812	.810	5

Inter-Item Correlation Matrix

	CL1	CL2	CL3	CL4	CL5
CL1	1.000	.745	.403	.530	.364
CL2	.745	1.000	.472	.310	.456
CL3	.403	.472	1.000	.507	.629
CL4	.530	.310	.507	1.000	.184
CL5	.364	.456	.629	.184	1.000

APPENDIX C2

Analysis Results for Cronbach's Alpha (Product Quality)

```
RELIABILITY
  /VARIABLES=PQ1 PQ2 PQ3 PQ4 PQ5 PQ6
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=MEANS COV CORR.
```

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.801	.802	6

Inter-Item Correlation Matrix

	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6
PQ1	1.000	.610	.642	.365	.400	.554
PQ2	.610	1.000	.470	.488	.419	.299
PQ3	.642	.470	1.000	.336	.315	.309
PQ4	.365	.488	.336	1.000	.218	.262
PQ5	.400	.419	.315	.218	1.000	.367
PQ6	.554	.299	.309	.262	.367	1.000

APPENDIX C3

Analysis Results for Cronbach's Alpha (Trust)

```
RELIABILITY
  /VARIABLES=TR1 TR2 TR3 TR4 TR5 TR6 TR7 TR8 TR9 TR10
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=MEANS COV CORR.
```

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.848	.854	10

Inter-Item Correlation Matrix

	TR1	TR2	TR3	TR4	TR5	TR6	TR7	TR8	TR9	TR10
TR1	1.000	.591	.122	.322	.655	.354	.462	.274	.473	.565
TR2	.591	1.000	.108	.359	.399	.454	.247	.281	.434	.578
TR3	.122	.108	1.000	.262	.122	.292	.279	.242	.043	.347
TR4	.322	.359	.262	1.000	.214	.367	.466	.420	.340	.479
TR5	.655	.399	.122	.214	1.000	.354	.462	.274	.291	.372
TR6	.354	.454	.292	.367	.354	1.000	.384	.443	.332	.717
TR7	.462	.247	.279	.466	.462	.384	1.000	.298	.383	.461
TR8	.274	.281	.242	.420	.274	.443	.298	1.000	.217	.485
TR9	.473	.434	.043	.340	.291	.332	.383	.217	1.000	.583
TR10	.565	.578	.347	.479	.372	.717	.461	.485	.583	1.000

APPENDIX C4

Analysis Results for Cronbach's Alpha (Cooperation)

```
RELIABILITY
  /VARIABLES=CN1 CN3 CN4 CN5 CN6 CN2
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS VARIANCE COV CORR.
```

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.842	.844	6

Inter-Item Correlation Matrix

	CN1	CN3	CN4	CN5	CN6	CN2
CN1	1.000	.201	.831	.893	.298	.477
CN3	.201	1.000	.453	.179	.238	.079
CN4	.831	.453	1.000	.846	.393	.457
CN5	.893	.179	.846	1.000	.466	.620
CN6	.298	.238	.393	.466	1.000	.668
CN2	.477	.079	.457	.620	.668	1.000

APPENDIX C5

Analysis Results for Cronbach's Alpha (Communication)

```
RELIABILITY
  /VARIABLES=CN1 CN2 CN3 CN4 CN5 CN6
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS COV CORR.
```

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.842	.844	6

Inter-Item Correlation Matrix

	CN1	CN2	CN3	CN4	CN5	CN6
CN1	1.000	.477	.201	.831	.893	.298
CN2	.477	1.000	.079	.457	.620	.668
CN3	.201	.079	1.000	.453	.179	.238
CN4	.831	.457	.453	1.000	.846	.393
CN5	.893	.620	.179	.846	1.000	.466
CN6	.298	.668	.238	.393	.466	1.000

APPENDIX C6

Analysis Results for Cronbach's Alpha (Commitment)

```
GET
  FILE='C:\Users\SCLeong-Toshiba\Google Drive\DBA\Data\Cronbach Alpha\Cronbachh Alpha analysis
N=CM.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.
RELIABILITY
  /VARIABLES=CM1 CM2 CM3 CM4 CM5 CM6
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS VARIANCE COV CORR.
```

Reliability

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	30	100.0
	Excluded[a]	0	.0
	Total	30	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.916	.929	6

Inter-Item Correlation Matrix

	CM1	CM2	CM3	CM4	CM5	CM6
CM1	1.000	.190	.286	.518	.216	.572
CM2	.190	1.000	.711	.282	.543	.590
CM3	.286	.711	1.000	.425	.311	.648
CM4	.518	.282	.425	1.000	.561	.335
CM5	.216	.543	.311	.561	1.000	.359
CM6	.572	.590	.648	.335	.359	1.000

APPENDIX D1

Analysis Results for Normality (Customer Loyalty)

```
DESCRIPTIVES VARIABLES=CL
  /SAVE
  /STATISTICS=KURTOSIS SKEWNESS.
```

Descriptives

Descriptive Statistics

	N	Skewness		Kurtosis	
		Statistic	Std. Error	Statistic	Std. Error
Customer Loyalty	267	.112	.149	-.360	.297
Valid N (listwise)	267				

Note: Z-values are computed by dividing the statistic by the standard errors (Hair, et al., 2007). Z-values for skewness is 0.751 and kurtosis is -1.212.

APPENDIX D2

Analysis Results for Normality (Product Quality)

```
DESCRIPTIVES VARIABLES=PQ
  /SAVE
  /STATISTICS=KURTOSIS SKEWNESS.
```

Descriptives

Descriptive Statistics

	N	Skewness		Kurtosis	
		Statistic	Std. Error	Statistic	Std. Error
Product quality	267	.316	.149	-.450	.297
Valid N (listwise)	267				

Note: Z-values are computed by dividing the statistics by the standard errors (Hair et al., 2007). Z-values for skewness and kurtosis are 2.121 and -1.515 respectively.

APPENDIX D3

Analysis Results for Normality (Trust)

```
DESCRIPTIVES VARIABLES=TR
  /STATISTICS=KURTOSIS SKEWNESS.
```

Descriptives

Descriptive Statistics

	N	Skewness		Kurtosis	
		Statistic	Std. Error	Statistic	Std. Error
Trust	267	.162	.149	.186	.297
Valid N (listwise)	267				

Note: Z-values are computed by dividing the statistics with standard errors (Hair et al., 2007). Z-values for skewness and kurtosis are 1.087 and -0.626 respectively.

APPENDIX D4

Analysis Results for Normality (Cooperation)

```
DESCRIPTIVES VARIABLES=CO
  /STATISTICS=KURTOSIS SKEWNESS.
```

Descriptives

Descriptive Statistics

	N	Skewness		Kurtosis	
		Statistic	Std. Error	Statistic	Std. Error
Cooperation	267	.187	.149	-.084	.297
Valid N (listwise)	267				

Note: Z-values are computed by dividing the statistics by the standard errors (Hair et al., 2007). Z-values for skewness and kurtosis are 1.255 and 0.283 respectively.

APPENDIX D5

Analysis Results for Normality (Communication)

```
DESCRIPTIVES VARIABLES=CN
  /SAVE
  /STATISTICS=KURTOSIS SKEWNESS.
```

Descriptives

Descriptive Statistics

	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Communication	267	.059	.149	.240	.297
Valid N (listwise)	267				

Note: Z-values are computed by dividing the statistics by the standard errors (Hair et al., 2007). Z-values for skewness and kurtosis are 0.396 and 0.808 respectively.

APPENDIX D6

Analysis Results for Normality (Commitment)

```
DESCRIPTIVES VARIABLES=CM
  /SAVE
  /STATISTICS=KURTOSIS SKEWNESS.
```

Descriptives

Descriptive Statistics

	N	Skewness		Kurtosis	
		Statistic	Std. Error	Statistic	Std. Error
Commitment	267	.243	.149	-.486	.297
Valid N (listwise)	267				

Note: Z-values are computed by dividing the statistics by the standard errors (Hair et al., 2007). Z-values for skewness and kurtosis are 1.631 and -1.642 respectively.

APPENDIX E1

Analysis Results for Non-response Bias (Customer Loyalty)

```
T-TEST GROUPS=CL_Types(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=CL_Means
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

	Responses	N	Mean	Std. Deviation
Customer loyalty	Early Respondents	105	6.21333	.376488
	Late Respondents	182	6.19148	.401739

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Customer loyalty	Equal variances assumed	.214	.644	.649	285	.517	.031852
	Equal variances not assumed			.659	232.399	.511	.031852

APPENDIX E2

Analysis Results for Non-response Bias (Product Quality)

```
T-TEST GROUPS=PQ(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=PQ_mean
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

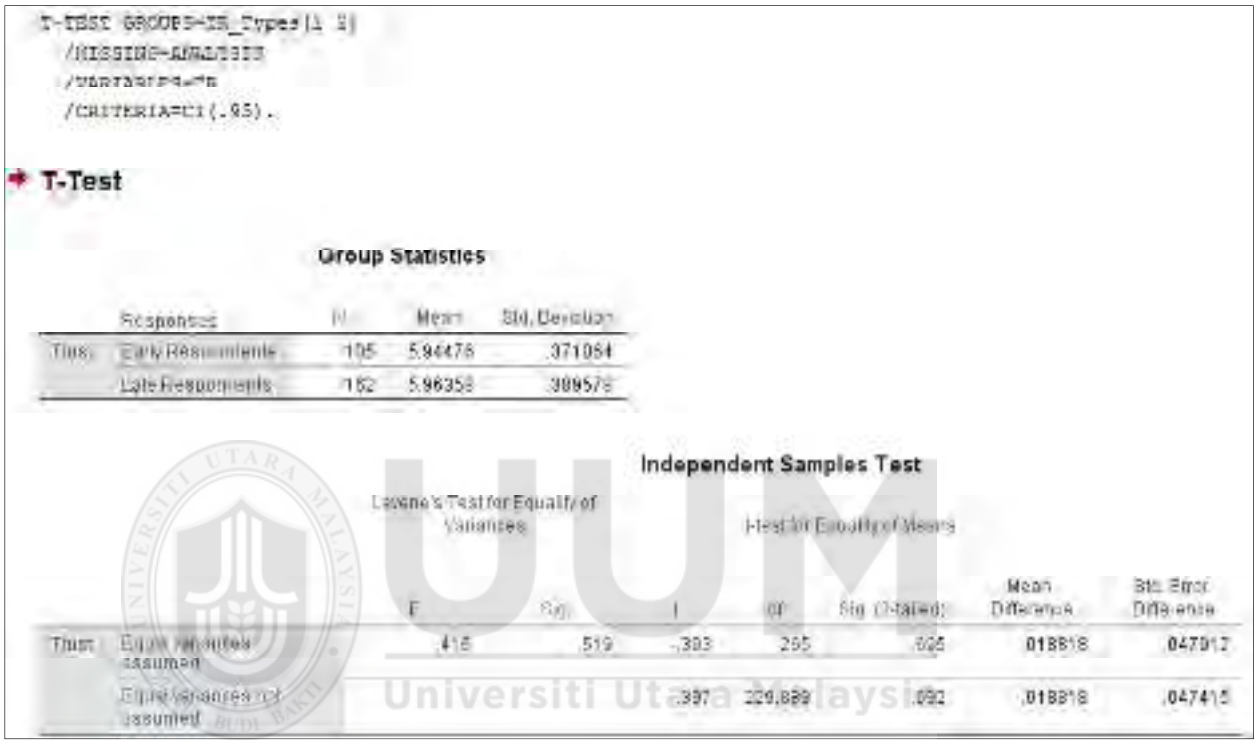
	Responses	N	Mean	Std. Deviation
Product quality	Early Respondents	103	6.21588	.377586
	Late Respondents	102	6.21602	.379711

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Product quality	Equal variances assumed	.019	.891	.003	265	.998	.000142
	Equal variances not assumed			.003	223.097	.998	.000142

APPENDIX E3

Analysis Results for Non-response Bias (Trust)



```
T-TEST GROUPS=IS_Type(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=TR
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

	Response	N	Mean	Std. Deviation
Trust	Early Respondents	105	5.94476	.371054
	Late Respondents	162	5.96358	.389579

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Trust	Equal variances assumed	.416	.519	-.393	265	.695	-.018818	.047917
	Equal variances not assumed			-.397	229.889	.692	-.018818	.047415

APPENDIX E4

Analysis Results for Non-response Bias (Cooperation)

```
T-TEST GROUPS=CO_Type(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=CO
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

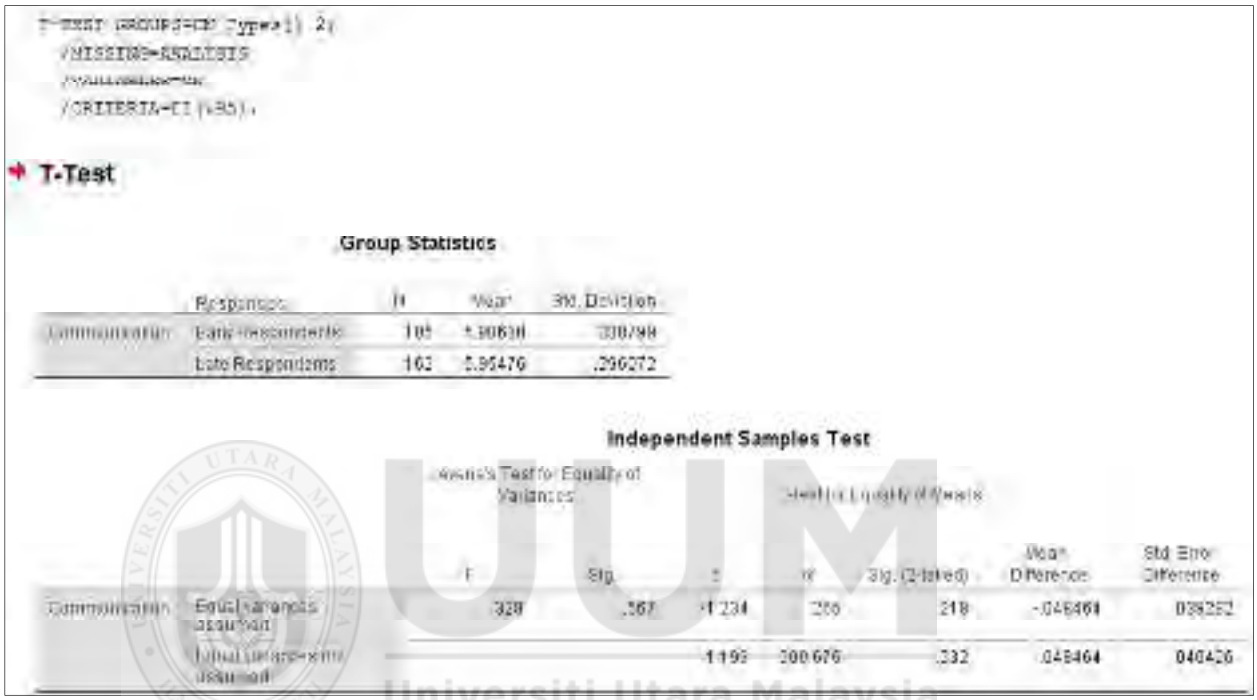
	Responses	N	Mean	Std. Deviation
Cooperation	Early Respondents	165	6.12219	.416173
	Late Respondents	162	6.06277	.395361

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Cooperation	Equal variances assumed	1.317	.252	1.175	325	.241	.059425	.050573
	Equal variances not assumed			1.176	319.000	.240	.059425	.050532

APPENDIX E5

Analysis Results for Non-response Bias (Communication)



T-TEST GROUPS=Type(1 2)
/MISSING=ANALYSIS
/VARIABLES=Com
/CRITERIA=CI(.95).

T-Test

Group Statistics

	Response	N	Mean	Std. Deviation
Communication	Early Respondents	165	4.00630	.338798
	Late Respondents	163	3.95479	.296272

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Communication	Equal variances assumed	.328	.567	1.234	326	.218	.048464	.039282
	Equal variances not assumed			1.193	300.676	.232	.048464	.040626

APPENDIX E6

Analysis Results for Non-response Bias (Commitment)

```
T-TEST GROUPS=CM_Types(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=CM
  /CRITERIA=CI(.95).
```

T-Test

Group Statistics

	Responses	N	Mean	Std. Deviation
Commitment	Late (Assumed)	185	6.15480	.409344
	Late Respondents	162	6.15835	.368548

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Commitment	Equal variances assumed	1.281	.257	-.089	255	.929	-.014368	.049262
	Equal variances not assumed			-.091	265.419	.927	-.014368	.049343

APPENDIX F

Analysis Results for Common Method Bias

```
DATASET ACTIVATE DataSet1.
FACTOR
  /VARIABLES CL1 CL2 CL3 CL4 CL5 EO1 EO2 EO3 EO4 EO5 EO6 IR1 IR2 IR3 IR4 IR5 IR6 IR7 IR8 IR9 IR10
    CO1 CO2 CO3 CO4 CO5 CO6 CM1 CM2 CM3 CM4 CM5 CM6 CM7 CM8 CM9 CM10
  /MISSING LISTWISE
  /ANALYSIS CL1 CL2 CL3 CL4 CL5 EO1 EO2 EO3 EO4 EO5 EO6 IR1 IR2 IR3 IR4 IR5 IR6 IR7 IR8 IR9 IR10
    CO1 CO2 CO3 CO4 CO5 CO6 CM1 CM2 CM3 CM4 CM5 CM6
  /PRINT INITIAL EXTRACTION
  /CRITERIA FACTORS(1) ITERATE(25)
  /EXTRACTION PC
  /ROTATION NOROTATE
  /METHOD=CORRELATION.
```

Factor Analysis

Total Variance Explained

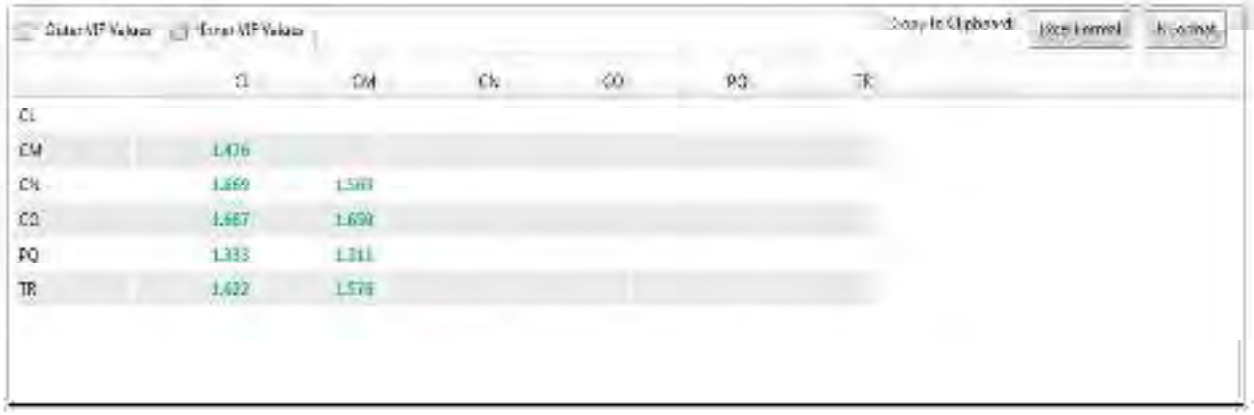
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.661	27.335	27.335	10.661	27.335	27.335
2	2.780	6.897	34.232			
3	2.023	5.188	39.420			
4	1.501	3.849	43.269			
5	1.405	3.602	46.870			
6	1.304	3.344	50.215			
7	1.138	2.918	53.133			
8	1.086	2.784	55.917			
9	1.041	2.669	58.586			
10	1.035	2.653	61.239			
11	938	2.405	63.644			
12	887	2.275	65.919			
13	880	2.257	68.176			
14	837	2.147	70.322			
15	808	2.072	72.394			
16	757	1.940	74.334			
17	750	1.923	76.257			
18	650	1.667	77.924			
19	647	1.659	79.583			
20	613	1.572	81.155			
21	581	1.490	82.645			
22	571	1.465	84.110			
23	549	1.408	85.518			
24	519	1.331	86.849			
25	501	1.285	88.134			
26	484	1.240	89.374			
27	472	1.211	90.585			
28	453	1.161	91.746			
29	446	1.144	92.890			
30	404	1.037	93.927			
31	378	.969	94.896			
32	368	.943	95.839			
33	332	.851	96.691			
34	290	.744	97.435			
35	283	.722	98.157			
36	263	.675	98.832			
37	234	.600	99.432			
38	221	.568	100.000			

Extraction Method: Principal Component Analysis.

APPENDIX G

Analysis Results for Multicollinearity

Collinearity Statistics (VIF)



	CL	CM	CN	CO	PO	TR
CL						
CM	1.476					
CN	1.669	1.503				
CO	1.667	1.659				
PO	1.333	1.311				
TR	1.632	1.578				

APPENDIX H1

Analysis Results for Descriptive Statistic (E&E sub-sector)

```
DATASET ACTIVATE DataSet1.
FREQUENCIES VARIABLES=Subsector
  /ORDER=ANALYSIS.
```

Frequencies

Statistics

E&E sub-sector

N	Valid	267
	Missing	0

E&E sub-sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Electronic components	131	49.1	49.1	49.1
	Industrial electronics	64	24.0	24.0	73.0
	Consumer electronics	33	12.4	12.4	85.4
	Electrical products	39	14.6	14.6	100.0
	Total	267	100.0	100.0	

APPENDIX H2

Analysis Results for Descriptive Statistic (Total Employees)

```
FREQUENCIES VARIABLES=EmployeeQuantity
  /ORDER=ANALYSIS.
```

Frequencies

Statistics

Total employees

N	Valid	267
	Missing	0

Total employees

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 50	23	8.6	8.6	8.6
	50 to 150	44	16.5	16.5	25.1
	151 to 500	96	36.0	36.0	61.0
	501 to 1000	59	22.1	22.1	83.1
	More than 1000	45	16.9	16.9	100.0
	Total	267	100.0	100.0	

APPENDIX H3

Analysis Results for Descriptive Statistic (Years of Operation)

```
FREQUENCIES VARIABLES=YearsOperation
  /ORDER=ANALYSIS.
```

Frequencies

Statistics

Years of operation

N	Valid	267
	Missing	0

Years of operation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 3	7	2.6	2.6	2.6
	3 to 5	14	5.2	5.2	7.9
	6 to 10	37	13.9	13.9	21.7
	11 to 15	54	20.2	20.2	41.9
	More than 15	155	58.1	58.1	100.0
	Total	267	100.0	100.0	

APPENDIX H4

Analysis Results for Descriptive Statistic (Annual Sales Turnover, 2016)

```
FREQUENCIES VARIABLES=SalesTurnover
  /ORDER=ANALYSIS.
```

Frequencies

Statistics

Annual sales turnover (2016)

N	Valid	267
	Missing	0

Annual sales turnover (2016)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than RM10m	30	11.2	11.2	11.2
	RM10m to RM25m	40	15.0	15.0	26.2
	RM26m to RM50m	60	22.5	22.5	48.7
	More than RM50m	137	51.3	51.3	100.0
	Total	267	100.0	100.0	

APPENDIX H5

Analysis Results for Descriptive Statistic (Ownership)

```
FREQUENCIES VARIABLES=Ownership
  /ORDER=ANALYSIS.
```

Frequencies

Statistics

Types of ownership

N	Valid	267
	Missing	0

Types of ownership

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Fully local (100%)	79	29.6	29.6	29.6
	Fully foreign (100%)	124	46.4	46.4	76.0
	Local (51% to 99%)	15	5.6	5.6	81.6
	Foreign (51% to 99%)	35	13.1	13.1	94.8
	Local-Foreign (50%-50%)	14	5.2	5.2	100.0
	Total	267	100.0	100.0	

APPENDIX I1

Analysis Results for Descriptive Statistic (Position in Firm)

```
FREQUENCIES VARIABLES=Position
  /ORDER=ANALYSIS.
```

Frequencies

Statistics

Position in firm

N	Valid	267
	Missing	0

Position in firm

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	General Manager or Factory Manager	43	16.1	16.1	16.1
	Manager	113	42.3	42.3	58.4
	Senior Staff	111	41.6	41.6	100.0
	Total	267	100.0	100.0	

APPENDIX I2

Analysis Results for Descriptive Statistic (Tenure in the Firm)

```
FREQUENCIES VARIABLES=ExperienceYears
  /ORDER=ANALYSIS.
```

Frequencies

Statistics

Years of experience in the firm

N	Valid	267
	Missing	0

Years of experience in the firm

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than 5	105	39.3	39.3	39.3
	5 to 10	77	28.8	28.8	68.2
	11 to 15	51	19.1	19.1	87.3
	More than 15	34	12.7	12.7	100.0
	Total	267	100.0	100.0	

APPENDIX I3

Analysis Results for Descriptive Statistic (Education Level)

```
FREQUENCIES VARIABLES=EducationLevel
  /ORDER=ANALYSIS.
```

Frequencies

Statistics

Education level

N	Valid	267
	Missing	0

Education level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Certificate/ Diploma	65	24.3	24.3	24.3
	First Degree	120	44.9	44.9	69.3
	Postgraduate Degree	70	26.2	26.2	95.5
	Professional	12	4.5	4.5	100.0
	Total	267	100.0	100.0	

APPENDIX I4

Analysis Results for Descriptive Statistic (Age)

```
FREQUENCIES VARIABLES=Age
  /ORDER=ANALYSIS.
```

Frequencies

Statistics

Age

N	Valid	267
	Missing	0

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 30	21	7.9	7.9	7.9
	30 to 40	98	36.7	36.7	44.6
	41 to 50	114	42.7	42.7	87.3
	Above 50	34	12.7	12.7	100.0
	Total	267	100.0	100.0	

APPENDIX J1

Analysis Results for Descriptive Statistic (Customer Loyalty)

```
DESCRIPTIVES VARIABLES=CL
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Customer loyalty	1335	4	7	6.16	.997
Valid N (listwise)	1335				

APPENDIX J2

Analysis Results for Descriptive Statistic (Product Quality)

```
DESCRIPTIVES VARIABLES=PQ
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Product quality	1602	5	7	6.22	.561
Valid N (listwise)	1602				

APPENDIX J3

Analysis Results for Descriptive Statistic (Trust)

```
DESCRIPTIVES VARIABLES=TR
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Trust	2670	4	7	5.96	.630
Valid N (listwise)	2670				

APPENDIX J4

Analysis Results for Descriptive Statistic (Cooperation)

```
DESCRIPTIVES VARIABLES=CO
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Cooperation	1602	4	7	6.08	.603
Valid N (listwise)	1602				

APPENDIX J5

Analysis Results for Descriptive Statistic (Communication)

```
DESCRIPTIVES VARIABLES=CN
  /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Communication	1602	4	7	5.95	.626
Valid N (listwise)	1602				

APPENDIX J6

Analysis Results for Descriptive Statistic (Commitment)

```
DESCRIPTIVES VARIABLES=CM
  /STATISTICS=MEAN STDDEV MIN MAX.
```

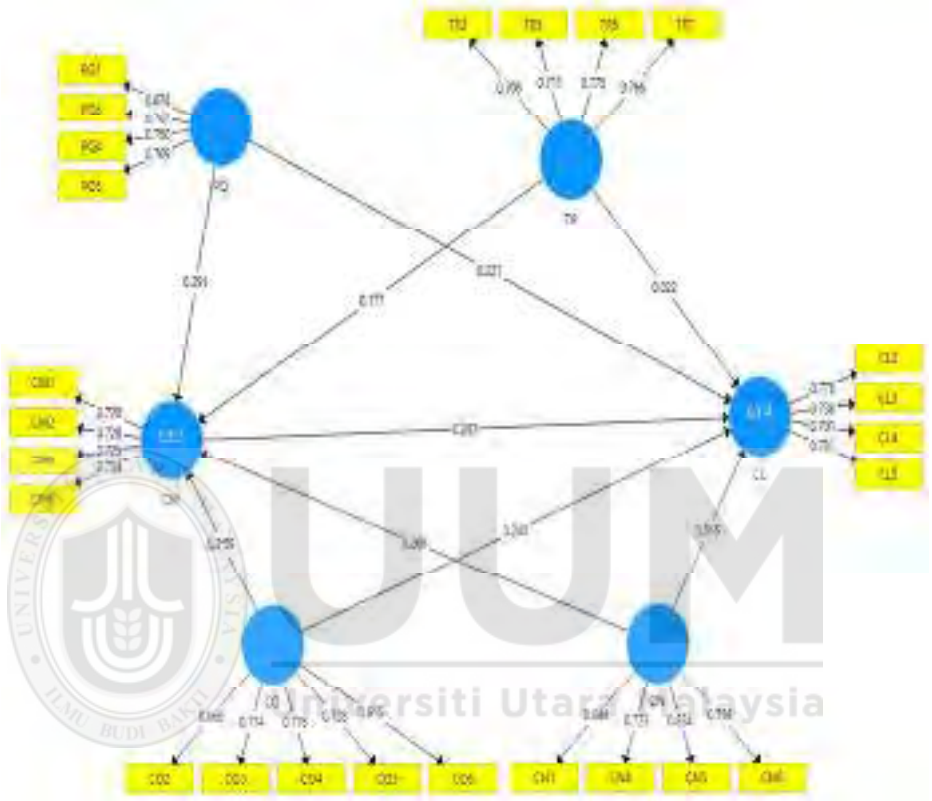
Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Commitment	1602	4	7	6,16	,579
Valid N (listwise)	1602				

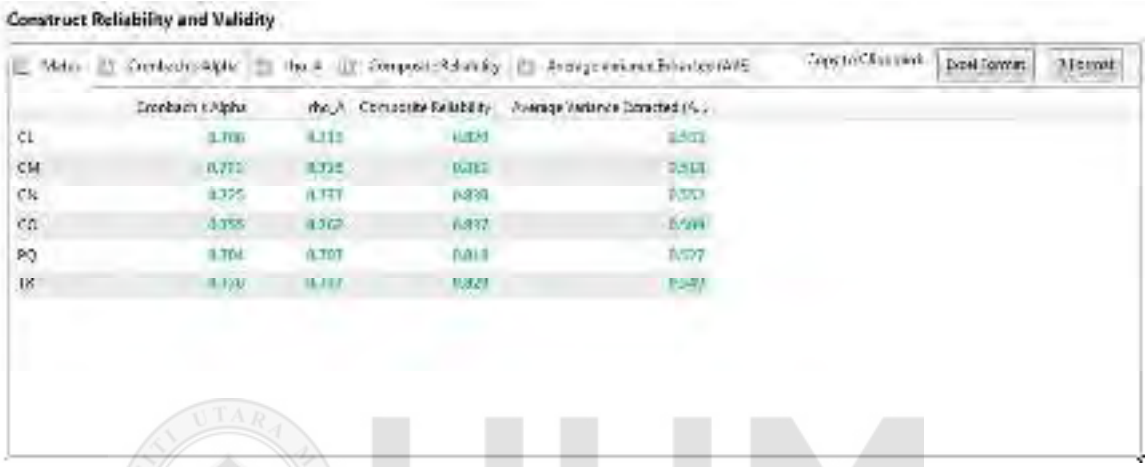
APPENDIX K1

Final Analysis Results for Indicator Reliability (Outer Loading)



APPENDIX K2

Analysis Results for Indicator Reliability and Convergent Validity (AVE and Composite Reliability)



APPENDIX L

Analysis Results for Discriminant Validity

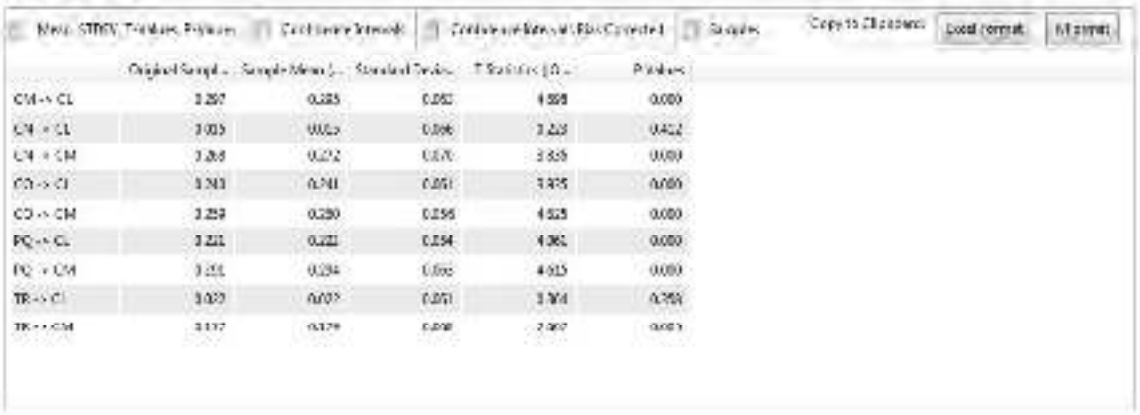
Discriminant Validity

	CL	CM	CN	CO	PQ	TR
CL	0.730					
CM	0.500	0.723				
CN	0.386	0.485	0.743			
CO	0.478	0.442	0.525	0.723		
PQ	0.438	0.384	0.409	0.369	0.726	
TR	0.377	0.440	0.482	0.556	0.386	0.741

APPENDIX M

Analysis Results for Path Coefficients and Significant of Relationships

Path Coefficients



	Original Sampl...	Sample Mean (...	Standard Deviat...	T Statistics (O...	P Values
CM -> CL	0.297	0.285	0.062	4.808	0.000
CM -> CL	0.019	0.019	0.046	0.418	0.412
CM -> CM	0.268	0.272	0.070	3.828	0.000
CO -> CL	0.743	0.741	0.051	14.575	0.000
CO -> CM	0.259	0.260	0.056	4.625	0.000
PQ -> CL	0.231	0.233	0.054	4.261	0.000
PQ -> CM	0.231	0.234	0.050	4.615	0.000
TR -> CL	0.029	0.027	0.051	0.564	0.286
TR -> CM	0.117	0.119	0.048	2.447	0.007

APPENDIX N

Analysis Results for Predictive Accuracy

APPENDIX O

Analysis Results for Mediation Analysis